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MANUAL ON ECONOMIC EVALUATION OF HIGHWAY PROJECTS IN INDIA

(Third Revision)



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GLOSSARY OF TERMS

₹ : Indian Rupee

2L : Two Lane Undivided Carriageway

4L : Four Lane Divided Carriageway

6L : Six Lane Divided Carriageway

8L : Eight Lane Divided Carriageway

A : End-of-year Equal Annual Payments for n years

ADT : Average Daily Traffic

B : Bus

B/C or B-C : Benefit-Cost Radio

BI : British Towed Fifth Wheel Bump Integrator

Bt : Value of Benefits which occur in the year t

C : Cars including Small and Big

CA : Compound Amount

CB : Big Car

CC : Centimeter Cube

CF_D: Distance related Congestion Factor

 $\mathsf{CF}_{\scriptscriptstyle\mathsf{T}}$: Time related Congestion Factor

CIF : Cost Insurance and Freight

CHC : Commodity Holding Cost in ₹/km

CRF : Capital Recovery Factor

CRRI : Central Road Research Institute

CS : Small Car

CSIR : Council of Scientific and Industrial Research

CV : Curvature in deg/km

CW : Crew Cost in ₹/km

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DC : Depreciation Cost in ₹/km

DCF : Discounted Cash Flow

EOL : Engine Oil in liters/1000 km

ET : Excluding Taxes

EW : Expressway

F : Sum of Money at a Future Date

FXT : Fixed Cost in ₹/km

FC : Fuel Consumption in cc/km

FL : Fall in m/km

G : Grease in kg/10,000 km

GNP : Gross National Product

HCV : Two-Axle Heavy Commercial Vehicles

HDM : Highway Development and Maintenance

hr : Hour

i : Interest Rate (compound) per annum or Discount Rate

Indo-HCM : Indian Highway Capacity Manual

IL : Intermediate Lane Carriageway

IRC : Indian Roads Congress

IRI : International Roughness Index

IRR : Internal Rate of Return

IT : Including Taxes

km : Kilometer

LC : Maintenance and Labor Cost in ₹/km

LCV : Light Commercial Vehicles

m : Meters

MARR : Minimum Attractive Rate of Return

mm : Millimeters

MCV : Multi-Axle Heavy Commercial Vehicles

MORTH: Ministry of Road Transport and Highways

MOST : Ministry of Surface Transport

n : Number of Years

NHDP : National Highway Development Program

NPV : Net Present Value

NP : New Price of the Vehicle in ₹

O-D : Origin - Destination

OL : Other Oil in Liters/10,000 km

P : Present Sum of Money

PCU : Passenger Car Units

PMGSY: Pradhan Mantri Gram Sadak Yojana

PT : Passenger Time Cost in ₹/km

PW : Present Worth

PWR : Power Weight Ratio

Q : Volume of Traffic in PCUs/hour

RF: Rise and Fall in m/km

RG: Roughness in mm/km

ROB : Road Over Bridge

RS: Rise in m/km

RUCS : Road User Cost Study

SCA : Compound Amount Factor of Uniform Series

SFF : Sinking Fund Factor

SF : Speed-Flow

SL : Single Lane

SP : Spare Part Cost ₹/km

SPW : Present Worth Factor

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T : Tonnes

TL: Tyre Life in km

TW : Two Wheeler

UPD : Utilization per Day in km/day

URUCS : Updation of Road User Cost Study

V : Speed in km/h

V-C or V/C : Volume-Capacity Ratio

VOC : Vehicle Operating Cost

VOT : Value of Passenger Time

 $W \ or \ W_{_{D}} \qquad : \qquad Width \ of \ Total \ Carriageway \ in \ m$

 $W_{\scriptscriptstyle D}$: Width of Carriageway in one direction in m

WPI : Wholesale Price Index

MANUAL ON ECONOMIC EVALUATION OF HIGHWAY PROJECTS IN INDIA

1. INTRODUCTION

1.1 During the last fifty years, a number of research studies 2,3,4,5,6,7,8,16,22,23,24,26,27 have been conducted to understand the relationship between the standards of road design (which depends upon the investments/costs) and the road user cost. Further, the changing vehicle technology, traffic mix and road conditions have necessitated the research on road user cost to be reviewed and updated periodically so as to adequately represent the changed conditions. For a proper assessment of economics of road projects, it is felt prudent to develop a uniform method of economic evaluation based on realistic quantification of costs and benefits. Moreover, this would facilitate rapid evaluation so that a large number of schemes/alternatives can be broadly evaluated to assist the decision makers in their job. Based on the above studies, the 'Manual on Economic Evaluation of Highway Projects in India' was first published in 1984 and subsequently revised in 1993 (first revision) and in 2009 (second revision). However, it is to be noted that even the manual of 2009 has become outdated and therefore it was felt essential to update the manual in the light of revised and updated Road User Cost (RUC) data developed based on the research study carried out by Central Road Research Institute (CRRI)⁴ sponsored by Council of Scientific and Industrial Research (CSIR) as part of the 11th Five Year Plan. In view of this, Transport Planning and Traffic Engineering Committee (H-1) of Indian Roads Congress had decided in its first meeting held on 25.05.2018 to undertake the third revision of this publication by taking the research output from the above study as the base.

Consequently, the H-1 Committee constituted an expert group in the above meeting consisting of Dr. Satish Chandra (Convenor), Dr. E. Madhu and Dr. S. Velmurugan. This expert group was requested to prepare an updated manual incorporating the findings of various studies for consideration by this Committee. The draft prepared by the expert group was deliberated in various meetings of H-1 Committee. The H-1 Committee in its meeting held on 17.05.2019 approved the document subject to incorporation of comments of members for placing before HSS Committee.

The composition of H-1 Committee is given below:

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Indian Roads Congress

The draft document was placed before the Highways Specifications and Standards Committee (HSS) in its meeting held on 20.07.2019. The HSS Committee decided that Convenor, H-1 Committee will modify the document based on comments offered during the meeting and will submit the final document to IRC for placing before the IRC Mid-Term Council meeting. The Mid-Term Council in its meeting held on 9th and 10th August, 2019 at Goa requested Convenor H-1 Committee to modify the document based on comments offered during the meeting and submit to IRC for placing before next Executive Committee (EC), who was authorized to take call about approval and publication of this document. The document was again discussed by the H-1 Committee and approved the same in its meeting held on 21.11.2019 for sending to EC of IRC. The EC in its meeting held on 19.12.2019 approved the document for publishing.

- 1.2 For a developing country like India, roads and road transport play an important role in economic growth. The construction of roads brings about a variety of benefits that are enjoyed practically by all sectors of the economy. The scarcity of resources and competing demands from various sectors are the dominating features of a developing economy. It, therefore, becomes extremely necessary to allocate the scare resources in the most beneficial manner amongst various sectors and, within a sector, amongst various schemes. In the absence of an adequate database, highway planners in India have been selecting schemes on a tentative basis, depending primarily on past experiences. It is quite likely that such an ad-hoc approach might lead to the selection of wrong solutions. For example, the planners so far placed a heavy reliance on the cost of construction of the facility initially, which they could estimate accurately, when selecting alternative schemes. Other important aspects such as the cost of maintaining the facility in future and the cost borne by the road user were disregarded.
- With the accomplishment of the Road User Cost Study (RUCS) completed in India in 1.3 1982 and the subsequent updating of RUCS data carried out in 1992, 2001 and 2011, it is now possible for the highway planners to evaluate the benefits from highway projects on an accurate

basis. Consequently, economic analysis of highway projects has become more scientific and rational.

- **1.4** Highway economic analysis, also known as highway project appraisal is a technique whereby the costs of and benefits from a scheme are quantified over a selected time horizon and evaluated by a common yardstick. The technique is also known as Benefit-Cost (B-C) analysis.
- **1.5** Economic evaluation serves a number of purposes^{9,17,18,27,28} which included the following:
- (i) Preparation of highway plans at the national, regional or local level within the overall development plan.
- (ii) To rank schemes within the highway sector plan competing for scarce resources in order of priority.
- (iii) To assess in phasing the road programme over a period of time depending upon the availability of resources.
- (iv) To compare mutually exclusive schemes and select the most attractive.
- (v) To determine whether a scheme under consideration is worth investing.
- (vi) To evaluate alternative strategies such as stage-construction or full construction; alternative specifications such as flexible pavement or rigid pavement; alternative policies such as increased outlay on maintenance or increased outlay on rehabilitation; alternative design standards and alternative policy options on axle loads.

The present manual is intended to help the highway planners and engineers in India to undertake economic evaluation of highway projects under non-urban conditions. The manual has been prepared from various published books and other sources which have been referenced so that the more inquisitive reader may be able to reach the original material if need be.

2. BASIC CONCEPTS OF ECONOMIC ANALYSIS

2.1 The subject of highway economic analysis has developed during the past five decades through the contribution of analysis belonging to various disciplines and notably highway engineers and economists. There were many issues on which conflicting viewpoints prevailed in the early stages of the evolution of the subject, but with the passage of time, there is now a general agreement on many important concepts. The analyst now has the advantage of the collective wisdom of the earlier practitioners of the art.

2.2 National View Point

In the highway sector, the construction and maintenance of the highways are financed from government funds, whereas the highway user is the general public. This implies that the costs of construction and maintenance are borne by the government, whereas the benefits arising out of highway construction and improvements are reaped by the general public. The construction of a highway or its improvement may also have an effect on another mode of transport, such as the railways, wholly owned and operated by the government. It is therefore logical that the multiplicity of interests can be encompassed if the economic analysis is done from a national view point, rather than a restricted view point of the government or one of its wings or the public

at large. This implies that consequences to any person or anybody in the country should be accounted for in the analysis.

2.3 Difference between Economic Analysis and Financial Analysis

In financial analysis, one is concerned with the ways and means of financing a project (by floating bonds or by levying toll) and the financial profitability of the project. Economic analysis, on the other hand, is not concerned with the sources of financing, the availability of funds and the allocation of funds^{28,29}. As such, funding of projects is a management decision. For example, the construction of a tolled highway or expressway has to be examined on the basis of its cost and the expected toll collections and the management may take a decision to construct the same if the toll collection seems to be attractive enough. Such an analysis is financial in nature. Economic viability which concerns with the consequences to all segments of the society, will still be necessary in such a case to establish its economic viability. However, even after the economic viability of a project has been established, the government may not take up the project due to lack of funds or because of the fact that the financial analysis has indicated that the returns are not attractive for the funding and recovery procedure selected.

2.4 Analysis is a Study of the Future

Economic analysis is not concerned about past events and investments. It is essentially a study of the future. The analysis, therefore, should estimate future traffic, costs and benefits.

2.5 All Possible Alternatives should be considered

The very basis of economic analysis being the selection of the most attractive option and in this regard, it is necessary that the analyst evaluates a number of possible alternatives. Of course, the basic alternative is the 'do-nothing', or the continuation of the present situation. All other alternatives are evaluated against this basic condition.

2.6 Marginal Differences

When considering a number of alternatives, it is not sufficient to evaluate each of them against the basic "do-nothing" alternative. It is also advantageous to consider the marginal differences in costs and benefits between two alternatives and carry out incremental analysis to establish whether the increment in investment also yields justifiable incremental benefits.

2.7 All Consequences should be considered

The investments on highways bring about a variety of consequences, some of which can be quantified into monetary terms and some cannot. All consequences which can be quantified monetarily should be considered and included in the analysis. Non-quantifiable effects should also be identified and presented to the decision maker. For example, impact of the project on the environment is an extremely important consideration in building highways. But it is very difficult to quantify in monetary terms the adverse effect on environment. All the same, at the Project Appraisal stage, the highway engineer must at least qualitatively highlight the effect on environment.

2.8 Analysis Period should not extend beyond the Period of Reliable Forecasts

There is considerable uncertainty of forecasts beyond a certain reasonable period. Human behaviour may change, travel pattern may undergo a shift and technology may experience transformation. Thus it is worthwhile to limit the analysis period to one of reliable forecasts. Moreover, since future costs and benefits are to be discounted, the inclusion or omission of costs or benefits beyond a reasonable period is hardly likely to influence the results. A period of 15-20 years beyond the completion of the project is generally considered for highway projects whereas in the case of expressway projects, the analysis period is considered up to 25 years.

2.9 All Future Cash Flows to be brought to a Common Time Datum

The present and future costs and benefits occur at different points of time. In order to evaluate them on a common basis, they should be reduced to equivalent values at a common date. This procedure is known as discounted cash flow and is based on the concept of time value of money.

2.10 Cost and Benefit Components of Equal Magnitude

There may be some cost and benefit components which remain equal in magnitude for all the alternatives. They may be omitted since they will in any case cancel out in the analysis.

3. TIME VALUE OF MONEY

3.1 Concept of Time Value of Money

Money appreciates in value in course of time due to the interest it earns. To illustrate the concept, consider ₹100 today, which if invested at 10 percent compound rate of interest, becomes ₹673 at the end of 20 years. Thus, ₹100 today is worth ₹673 at the end of 20 years. In other words, ₹673 at the end of 20 years is worth only ₹100 now. This concept helps the analyst in reducing all future costs and benefits to a common date and thus evaluate on a common basis. The concept is thus the foundation on which the entire structure of economic analysis is built.

3.2 Definition of Commonly Used Terms

Interest is defined as the money paid for borrowed money. It also indicates the return obtainable by the productive investment of capital.

Interest Rate is the interest paid or the return obtained at the end of one year, expressed as a percentage of the capital at the beginning of the year. Interest rate can be either simple rate (where the interest is paid to the lender every year) or compound rate (where the interest accrued is added to the capital).

Present Worth is the present value of a future payment or a series of future payments at the given rate of interest. In the example given in Para 3.1, the present worth of ₹673 at the end of twenty years is ₹100 at a rate of interest of 10 percent per annum (compound).

Discounting is the process of calculating the present worth of a future payment. Thus, in the above example, ₹673 at the end of 20 years, when discounted at 10 percent per annum, amounts to ₹100 at the present time. Discount rate is the interest rate at which future payments are reduced to a common time.

Rate of Return is the term commonly used in economic analysis for the rate at which economic benefits are obtained by a project. Though it generally means the same as interest rate of discount rate are more appropriate in economic analysis. The term interest rate is more commonly used while borrowing capital.

Minimum Attractive Rate of Return (MARR) is that rate of return which must be ensured in any project if it has to be selected for implementation.

3.3 Compound Interest Equations

The mathematical problems involving compound interest have been simplified by the use of six standard equations presented in **Table 1**.

Table 1 Compound Interest Equations

S. No.	Equation	Use	Factor
1	$F = P (1 + i)^n$	Given P, to find F	$(1+i)^n$ is known as Compound Amount (CA) Factor
2	$P = \frac{F}{(i+1)^n}$	Given F, to find P	$\frac{1}{(i+1)^n}$ is known as Present Worth (PW) factor of Single Sum
3	$F = \frac{(1+i)^n - 1}{i} * A$	Given A, to find F	$\frac{(1+i)^n-1}{i}$ is known as Compound Amount Factor of Uniform Series (SCA)
4	$A = F * \frac{i}{(1+i)^n - 1}$	Given F, to find A	$\frac{i}{(1+i)^n-1}$ is known as Sinking Fund Factor (SFF)
5	$P = \frac{(1+i)^n - 1}{i * (1+i)^n} * A$	Given A, to find P	$\frac{(1+i)^n-1}{i*(1+i)^n}$ is known as Present Worth Factor of Uniform Series (SPW)
6	$A = \frac{i * (1+i)^n}{(1+i)^n - 1} * P$	Given P, to find A	$\frac{i*(1+i)^n}{(1+i)^n-1}$ is known as Capital Recovery Factor (CRF)

Where, P = present sum of money;

i = interest rate (compound) per annum

n = number of years

F = sum of money at a future date

A =end-of-year equal annual payments for n years

Using the above formulas the future worth of money can be calculated under given interest rates. The use of above formulas is illustrated in the following examples:

Example 1:

Find the future worth of ₹ 1,00,000 at the end of 20 years invested at a compound rate of interest of 12 percent per annum.

From **Table 1**, CA (i=12%; n=20 years) can be calculated as = 9.6463 Therefore, future worth at the end of 20 years = ₹ 1,00,000 x 9.6463 = ₹ 9,64,630

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Example 2:

What is the present worth of a sum of ₹ 75,000 at the end of 10 years when the discount rate is 10 percent per annum?

From **Table 1**, PW (i=10%; n=10 years) can be calculated as = 0.3855

Therefore, present worth at the end of 10 years = ₹ 75,000 x 0.3855

= ₹ 28,912.50

Example 3:

The annual cost of maintenance of a new road thrown open to traffic is ₹ 15,00,000. What is the future worth of this expenditure at the end of 10 years when the rate of interest is 15 percent per annum?

From **Table 1**, SCA (i=15%; n=10 Years) can be calculated as = 20.3037

Therefore, future worth at the end of 10 years =₹15,00,000 x 20.3037

= ₹ 3,04,55,550

Example 4:

A major rehabilitation of a pavement will be done 10 years from hence at a cost of ₹ 100 lakh. What should be the series of uniform annual payments that must be set apart to accumulate this amount, if the interest rate is 9 percent per annum?

From **Table 1**, SFF (i=9%; n=10 years) can be calculated as = 0.0658

Therefore, amount of uniform annual payment = 0.0658 x ₹ 100 lakh

= ₹ 6.58 lakh

Example 5:

The annual maintenance cost of a major bridge is ₹ 50,000. What is the present worth of this cost incurred for 10 years after the opening of this bridge? The discount rate may be taken as 12 percent per annum.

From **Table 1**, SPW (i=12%; n=10 years) can be calculated as = 5.6502

Present Worth = ₹ 50,000 x 5.6502 = ₹ 2,82,510

Example 6:

The cost of construction of a new facility is ₹ 200 crore at current price and is met with by raising a loan. What is the annual payment of equal amount for 20 years to repay the loan, if the rate of interest is 10 percent per annum?

From **Table 1**, CRF (i=10%; n=20 Years) can be calculated as= 0.1175

Equal annual payment to repay the loan = 0.1175 x ₹ 200 crore

= ₹ 23.50 crore

4. TOTAL TRANSPORTATION COST

- **4.1** In highway economic analysis, one has to consider the total transportation cost, which comprises the following:
 - (1) Cost of construction of the facility initially
 - (2) Periodic cost of maintaining the facility over its design life
 - (3) Road User Cost
- **4.2** The three components are interdependent, and the designer has to choose that alternative which holds the sum total of the three to a minimum. Road User Cost is composed of the following main components:
 - (1) Vehicle Operating Cost
 - (2) Time Cost
 - (3) Accident Cost

The detailed discussions on the determination of costs and benefits for economic analysis are given in later sections.

5. DETERMINATION OF HIGHWAY COSTS

- 5.1 The first two components of the total transportation discussed earlier, viz. the cost of construction of the facility initially and the periodic cost maintenance of the facility over its design life are known collectively by the term 'highway costs'.
- 5.2 The cost of construction of the facility includes the following:
 - (i) Survey, investigation and design costs
 - (ii) Land acquisition costs
 - (iii) Construction costs
 - (iv) Physical contingencies (unforeseen items and unforeseen increase in cost not attributable to escalation and unforeseen increase in quantities)
 - (v) Supervision, quality control and administration charges
- 5.3 The cost of maintenance of the facility includes the following:
 - 1. Ordinary repairs such as patch repairs, pot-hole filling, dressing earth work, etc.
 - 2. Periodic repairs, such as renewals and resurfacing
 - 3. Any emergent or special repairs
 - 4. Operational expenses, such as traffic signals, traffic aid posts, lighting, policing etc.
 - 5. Supervision and administration charges.
- **5.4** When dealing with the highway costs, it is necessary to phase the same year by year. For example, if a project estimated to cost ₹ 500 crore is sanctioned now, the expenditure will generally be incurred over a period of 3-5 years depending upon various factors. It is necessary to breakdown the outlays in each year of its construction. As an illustration, the breakdown of cost for a road project amounting to ₹ 500 crore is given in **Table 2**.

Table 2 Breakdown of Cost Outlay

Year	Cost (₹ in Crore)		
1st Year	50.0 (10%)		
2 nd Year	100.0 (10%)		
3 rd Year	150.0 (10%)		
4 th Year	200.0 (10%)		
Total	500.0 (10%)		

Table 3 Breakdown of Cost Outlay during Construction and Maintenance Periods

Year	Cost (₹ in Crore)
1 st	
2 nd	Construction Deviced
3 rd	Construction Period
4 th	
5 th	0.50
6 th	0.50
7 th	0.50
8 th	0.50
9 th	2.00
10 th	0.50
11 th	0.50
12 th	0.50

Similarly, in the case of maintenance costs, year-by-year costs have to be identified. Thus, if the yearly maintenance cost of the highway project illustrated earlier are ₹ 0.50 crore and the cost of renewal of the surface once in five years is ₹ 2.00 crore, it will be represented as given in **Table 3**. These values will be same, repeating the cycle, till the design life of the project.

5.5 Difference between Economic Costs and Financial Costs

In economic analysis, one is concerned with economic costs and not financial costs. Financial costs are easy to determine, because they represent the actual amount one has to pay to get a road constructed and maintained. They are the engineer's estimates to get the project sanctioned and they are shown in the account books and budgets. In a perfectly competitive market and where taxes are not levied, the financial cost is very nearly equal to the economic cost. But when the market is imperfect and where taxes are levied, the financial costs and economic costs are not the same. Economic costs are based on the "opportunity cost" of each of the constituent costs such as labour, material and machinery. In order to derive the economic costs, these constituents have to be isolated, quantified and adjusted on the basis of certain principles discussed in the succeeding section.

5.6 Shadow Pricing

In many developing countries, a considerable amount of distortions have arisen in the prices as a result of government policies, regulations and bad investment planning. This scenario is true

in the case of Indian situation as the domestic prices of many commodities are administered by the government and the traded prices are not at par with the international market prices. The minimum wages, especially of unskilled labour are also fixed statutorily by the government, and in an over-populated and labour-surplus economy like India, the wages do not truly reflect the economic cost. Foreign exchange is extremely precious for the Indian economy, but the official exchange rate does not reflect this. Adjustments needed in the prices of goods and wages to make them reflect truly their market value are known as shadow pricing.

The wages of unskilled labour are regulated by the government and are also determined by the bargaining power of the trade unions. Since there is a large unemployment problem in this sector in the country, the wages paid do not reflect the surplus conditions. If true market forces were to be at work, the wages might probably come down. The exact determination of the shadow wage rate depends upon a number of factors and this indeed is a complicated matter. For Indian conditions, it is assumed that the shadow wage rate is half the actual wages paid. For semi-skilled and skilled labour, there is no need to do shadow-pricing since there is generally a scarcity of these categories and the market wages more or less reflect this situation. If the analyst has reasons to believe that the statutory wage rates are low, there is a justification for an upward shadow-pricing of semi-skilled and skilled labour wages. The current practice in the Project Appraisal Division of the Planning Commission is not to segregate labour component and not to use shadow wage rate²⁰.

India is by and large self sufficient in highway construction machinery and materials needed for the project. Nevertheless special occasions may arise when some items of modern equipment or some materials have to be imported. For example, sophisticated state of the art hot mix plants, paver finishers and concrete paving equipment may have to be imported for major projects. Foreign exchange is scarce in a developing country like India and to value the import cost at the official exchange rate would be to disregard this fact. Hence, the general practice in the country is to shadow price foreign exchange at 25 percent above the official rate.

Certain commodities are both produced locally and imported. A typical example is fuel oil. The domestic price may not reflect the true international price. In such cases, it is desirably to consider the border price (price at the country's border, which is the CIF price). It is of course, a debatable point whether the border price should further be adjusted to reflect foreign exchange out-go in the case of imports. If such adjustment is done, it should bear a relation to the ratio of import to domestic production of the commodity.

Taxes are levied by the Government on a number of items of goods which are inputs to the cost of highway project. They include import duty, excise duty and sales tax. Such taxes do not represent an economic cost as they are not part of the cost of resources used in the production of the goods. They are in fact transfer payments within the economy. Similarly, license fees fall into the same category. Certain commodities may be sold in the country of subsidized rates. Such subsidies should be disregarded in economic evaluation.

All the above principles of shadow pricing apply equally to the cost streams (i.e. highway construction and maintenance cost) and the benefit streams (i.e. road user benefits). As an approximation in many of the projects taken up in India, a factor of 0.80 - 0.90 has been used to convert financial costs of road works to economic costs.

5.7 Treatment of Inflation

The construction of a highway project takes a number of years and during this period, the cost of labour, materials and equipment may undergo an inflationary trend. Similarly, the benefits of reduced Vehicle Operating Costs may be higher in future years due to inflation. Since general inflation results in the price rise in all goods, the relative prices remain constant. Hence it is the practice to disregard escalation and inflation, both on the cost stream and the benefit stream. However, changes in relative prices should be allowed at least up to the extent that they can be foreseen accurately which can help in demonstrating how they affect costs and benefits differently.

5.8 Modes of Highway Project Implementation and Associated Interest on Capital Costs

Highway projects in India are primarily financed from government funds i.e. public funded projects whereas few of the projects implemented under National Highway Development Program (NHDP) are also being implemented following the Public - Private Partnership (PPP). In addition, the Government has come up with various innovative financing models and means to mobilize funds from the market viz. Hybrid Annuity Model (HAM); Toll-Operate-Transfer (TOT) Model, etc.

In the case of public funded projects, it is normally executed either through conventional 'Item Rate Contract' or through the Engineering Procurement and Construction (EPC) contracts. In the case of Item Rate Contract project execution, the responsibilities for design, development and maintenance lie with the Project Authority i.e. road owning agency whereas in the case of EPC contracts, the onus lie with the contractors. Due to the above mechanism of funding, in the case of government funded projects, there is no need to include yearly interest on the initial cost of construction in economic analysis.

In the case of PPP projects, various variants of project implementation being practiced are BOT (Toll), BOT (Annuity) and Hybrid Annuity depending on the mode of financing. Considering the fact that the above variants of BOT projects contain private funding, it is necessary to include interest charges incurred by the private developer.

6. DETERMINATION OF BENEFITS

- 6.1 The quantification of economic benefits from highway projects is usually much more difficult than determination of costs. This is because of the following reasons:
- Benefits from highway are varied in nature, some of them are direct and some indirect.
 Direct benefits such as reduced Vehicle Operating Costs can be easily measured, whereas indirect benefits such as improved agriculture and accelerated growth of the economy cannot be measured easily.
- Even when the benefits are direct, some of them are difficult to quantify. Examples
 are: value of passenger time savings, value of reduced air pollution, value of reduced
 noise levels and value of improved aesthetics.
- Benefits which occur in the future are closely related to future traffic, forecast of which
 is difficult.
- Benefits can be determined only when alternatives are considered. Since there are many alternatives possible, benefits vary with each comparison. If the analyst misses

an important alternative, it is likely that an accurate measurement of benefits is missed and what is achieved by evaluation of other alternatives is either an understatement or over-statement of benefits.

6.2 Sometimes, confusion is likely to occur in the minds of analysts whether to treat a particular item, as "costs" or "benefits". Under these circumstances, the simple rule to be followed to avoid such confusion is to denote the cash out-flows as negative and hence costs, and cash in-flows as positive and hence benefits.

6.3 Types of Traffic Receiving Benefits

Benefits due to highway projects are received by the following categories of traffic:

- (i) Normal traffic
- (ii) Diverted traffic
- (iii) Generated traffic or induced traffic

Normal traffic is the traffic which would have developed on the existing facility whether or not any improvements would be made.

Diverted traffic is the traffic diverted on to, or away from, the route or mode being studied. Thus, the construction or improvement of a road may take away traffic from a railway line. In that case, what appears as a benefit to the highway project due to increased traffic is actually a loss to the railways. Both should be quantified and accounted for. Similarly, if a bypass is constructed for a congested city, the existing road will be decongested due to traffic diversion and will thus receive some reduction in VOC. This also should be accounted for. Generated (or induced) traffic is the new traffic that develops because of new travelers making use of improved or new facility.

The benefits to normal traffic and diverted traffic are evaluated by multiplying the change in user costs by the change in traffic. However, while dealing with generated traffic, the benefits are found by multiplying half the change in user costs by the change in traffic^{14,28}.

6.4 Benefits from Highway Improvements

The benefits from highway improvements can be broadly classified as under:

- (1) Road User benefits
 - (a) Vehicle Operating Cost (VOC) savings
 - (b) Value of travel time savings
 - (c) Value of savings in accident costs
 - (d) Savings in maintenance costs
- (2) Social benefits
 - (a) Improvements in administration, law and order and defense
 - (b) Improvements in health and education
 - (c) Improvements in agriculture, industry, trade and mining
 - (d) Improvements in environmental standards
 - (e) Appreciation in value of land adjacent to roads

Considering the existing state of knowledge in the country, it is possible to monetarily quantify only the direct road user benefits. Only when sufficient research is carried out on other aspects can the full quantification of benefits be possible. The present manual, therefore, restricts itself to only the direct road user benefits.

6.5 Factors Affecting Road User Costs

Research works carried out in India has isolated the effect of the following components on the road user costs^{2,3,4,16}.

- 1. Roadway Factors
 - (a) Pavement width
 - (b) Pavement surface type and its riding quality, as measured by its roughness
 - (c) Vertical profile
 - (d) Horizontal geometry
 - (e) Number of junctions per Kilometer (in case of accident costs)
- Vehicle Factors
 - (a) Type
 - (b) Age
 - (c) Make
 - (d) Engine horse-power
 - (e) Power Weight ratio
- Traffic Factors
 - (a) Traffic volume
 - (b) Traffic composition
 - (c) Speed
 - (d) Congestion

The pavement width (W) is considered in meters and generally has the following values:

Single lane roads : 3.75 m

Intermediate lane roads : 5.5 m

Two lane roads : 7.0 m

Four-lane (divided) roads per direction : 2 x 3.5 m

Six-Lane (divided) roads per direction : 3 x 3.5 m

Eight-Lane (divided) roads/expressways per direction : 4 x 3.5 m

The Roughness of the road (RG) is measured by the British Towed Fifth Wheel Bump Integrator (BI) and is expressed in mm/km. The recommended roughness values on Indian roads as can be referred from IRC:SP:16-2019.

The other method of measuring roughness is the International Roughness Index (IRI). The following equation presents the relationship between BI (in mm/km) and IRI (in m/km):

$$BI = 630*(IRI)^{1.12}$$

The analyst should obtain the actual values from field measurements and use the above values only when no such measurements have been made.

The vertical profile of the road is measured in terms of meters of Rise and Fall (RF) per Kilometer. The horizontal curvature is measured by the average degree of Curvature (CV) per Kilometer and the typical values of RF and CV are presented in **Table 4**. **Fig. 1** depicts the method of quantification of the same and the quantities can be calculated as given below:

Average curvature of section AB, CV (deg/km)= $\emptyset_1 + \emptyset_2 + \emptyset_3 + \dots + \emptyset_n$ / Distance AB (km) Average rise of section AB, RS (m/km) = $h_1 + h_3 + h_5 + \dots + h_m$ / Distance AB (km) Average fall of section AB, FL (m/km) = $h_2 + h_4 + h_6 + \dots + h_n$ / Distance AB (km) Average rise and fall of section AB, RF (m/km) = $h_1 + h_2 + h_3 + \dots + h_m + h_n$ / Distance AB (km)

Table 4 Typical Values of RF and CV for various terrains in India

Tarrein	DE	Curvature	
Terrain	RF	Low Curvature	High Curvature
Plain	0-15	Less than 50	Above 50
Rolling	15-30	Less than 100	Above 100
Hilly	30-50	Less than 200	Above 200

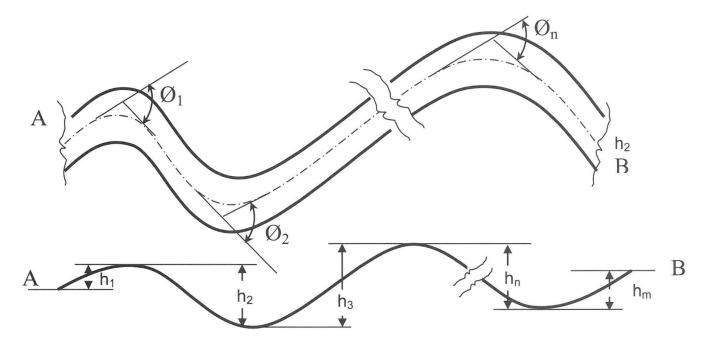


Fig. 1 Methods of Specifying the Curvature and Longitudinal Profile of a Road Section

RF and CV are highly correlated and it is generally sufficient to consider one of the two in the analysis. The number of intersections per Kilometer (J) on a road section influences accident rate. In highway economic analysis, the effect of traffic on speeds is important. The research studies conducted^{2,3,4,16} have enabled the formulation of the speed-flow equations and the same are presented in **Annex-A**.

6.6 Benefits due to Reduction in Vehicle Operating Cost (VOC)

The Vehicle Operating Cost (VOC) components are:

- (1) Fuel
- (2) Lubricants
- (3) Tyres
- (4) Spare parts
- (5) Maintenance labour
- (6) Depreciation
- (7) Wages of crew
- (8) Fixed costs (overheads, administration, interest on borrowed capital etc.)

The equations for determining the VOC components for various types of vehicles are given in **Annex-B**. The prices of VOC inputs used for calculating VOC components for various types of vehicles are given in **Annex-C**. Based on these, the VOC Tables have been prepared and presented in **Annex-D**. As the number of diesel cars is gradually on the increase, the proportion of cars has been taken in the ratio of 70 percent petrol driven cars to 30 percent diesel driven cars based on extensive market surveys from recent studies²³. The VOC values worked for different vehicle types are as per March 2019 price levels and are exclusive of taxes in the case of economic costs and inclusive of taxes in the case of financial costs. To obtain the VOC values for intermediate values of Roughness and Rise/Fall values (i.e. other than those presented in **Annex-D**), the VOC values presented for a given vehicle type needs to be interpolated accordingly.

6.7 Application of Wholesale Price Index (WPI) Values

It is an established fact that Road User Cost (RUC) would increase in accordance with increase in Vehicle Operating Cost (VOC) which implies that RUC depends upon the change in Wholesale Price Index (WPI). Generally, weekly, monthly as well as yearly WPI data is being prepared by the Ministry of Commerce and Industry (Office of the Economic Advisor)20. From their website, it is possible to get the weekly WPI data for every commodity including Transport Equipments and Parts, Petrol and High Speed Diesel as well as the overall WPI. For quick estimation of VOC for any year, it is possible to apply the WPI index for all commodities. Some of the VOC components are considered from CRRI study in 2011⁴ and rest are taken from IRC:SP:30-2009 for updation. Accordingly, the WPI values are taken from both years of 2009 and 2011 to calculate WPI ratios. However, during this period, the WPI values have become 100 as the base year has been considered by OEA 20 in the year 2005 and 2012. Taking these aspects into consideration, WPI values have been calculated as on 31st March, 2011 i.e. the reference analysis year when the VOC equations were updated by CRRI in 20114 study and also 31st March, 2009 i.e. to consider the values from IRC:SP:30-2009. The calculated ratios to update the VOC data from 2009 to 2019 and 2011 to 2019 for different items have been shown in Table 5. These WPI ratios have been appropriately applied for updating the VOC components so as to arrive values for the year 2019.

Table 5 Calculated WPI Ratios from the years 2009 and 2011 to the year 2019 for Different Components

S.	Item	WPI Value	WPI Ratio	WPI Ratio
No.		(March 2019)	(2019 to 2009)	(2019 to 2011)
1	All Commodities	120	1.533	1.303
2	Transport Equipment and Parts	113.3	1.234	1.175
3	Petrol	86	1.596	1.176
4	High Speed Diesel	96.7	1.867	1.645

To calculate VOC for future target years, the WPI values of March 2019 given in **Table 5** can be used as the base and ratio can be calculated for the target year by taking WPI values of target year from Economic Adviser Website²⁰ and that ratio thus calculated can be utilised to multiply the individual VOC components to arrive the cost in the future years.

6.8 Travel Time Savings

Generally, savings in travel time are enjoyed by bus passengers, car passengers and two-wheeler riders. The travel time values covering various types of road users for March 2019 price levels⁵ are presented in **Table 6** which is basically derived by multiplying with the relevant WPI ratio(s) given in **Table 5**.

Table 6 Value of Travel Time of Passengers

			Value of Time (₹/hr)			
S.	No.	Transport Mode used by Passenger	Multilane Carriageways/ Expressways	Two Lane Roads	Single and Intermediate Lane Roads	
1	(a)	Small Car	178.5	117.3	98.5	
	(b)	Big Car	258.0	117.3	96.5	
2		Two Wheeler	60.5	60.1	41.3	
3	(a)	Ordinary Bus	73.2	73.2	27.2	
	(b)	Deluxe Bus	109.0	81.6	-	

Since the passenger travel time savings in a developing country like India are not sometimes considered in economic analysis, the analyst may perform economic analysis with and without this component. The occupancy of cars, two wheelers and buses should be found from actual surveys⁴. In the absence of the same, the values suggested below may be adopted:

Average occupancy of a Small Car	= 3.23
Average occupancy of a Big Car	= 4.28
Average occupancy of a Two Wheeler	= 1.71
Average occupancy of an Ordinary Bus	= 30.0
Average occupancy of a Deluxe Bus	= 40.0

However, it is to be noted the above values vary from region to region. For a major project like Expressway, where travel time savings are very significant, the accurate value of time of passengers and commodity in transit may have to be determined. The rates suggested for

passenger travel time values have been appropriately accounted by considering 85 % work trips and 15 % social/leisure trips based on the studies conducted by CRRI^{2,3,4}.

In the case of commodities, lesser travel time signifies smaller inventory cost. Speedier travel means that for transporting the same quantity of goods in a certain period, lesser number of commercial vehicles can be used. Speedier travel leads to reduction in the fixed charges per km, which every operator has to pay. Quicker travel also results in time savings to the vehicle crew. The savings in travel time are an important component of the benefits from highway improvements. Theoretically, it is possible to visualize the savings in cost of holding inventories by working out the value of goods held during the transport and deriving the interest payment thereon per hour. The value of commodity in transit may be considered separately for different types of commercial vehicles plying on different types of carriageways. The types of commercial vehicle considered are: Light Commercial Vehicles (LCV), Two/Three Axle Heavy Commercial Vehicles (HCV) and Multi-Axle Heavy Commercial Vehicles (MCV). The values presented in Table 7 are the updated values of the study titled, "Updation of Road User Cost Data" conducted by CRRI in 2011⁴ by considering the relevant WPI price levels (refer Table 5) as of March, 2019.

S. No.	Type of Carriageway	Vehicle Type	Value of Commodity (₹/tonne)	Average Load (tonne/Veh)	Commodity Holding Cost (₹/day)
1	Multilane	LCV	69,813	6.5	228.0
	Carriageways/	HCV	3,09,182	10.7	1654.8
	Expressways	MCV	3,51,921	14.8	2606.0
2	Two Lane Roads	LCV	66,234	3.2	109.5
		HCV	72,707	9.0	333.6
		MCV	72,707	14.8	625.4
3	Single/Intermediate	LCV	62,669	3.2	101.6
	Lane Roads	HCV	66.703	8.4	278.8

Table 7 Value of Commodity on Different Types of Carriageways

6.9 Accident Cost Saving

As it is possible to predict the reduction in accidents on account of road improvements, the accident cost values evolved from the earlier studies can be used after updating using the ratio of WPI for the economic cost of different types of accidents and economic cost of vehicle damage. The values presented in **Tables 8** and **9** are the updated values, which was primarily updated from the study titled, "Evaluation of Road Accident Costs" conducted by TCS (1999)²⁵ considering the relevant WPI price levels (refer **Table 5**) as of March, 2019.

Table 8 Economic Cost for Different Type of Accidents

S. No.	Category of Accident	Economic Cost of Accidents (₹)
1	Fatal	13,25,049
2	Major (Serious Injury)	4,32,651
3	Minor Injury	46,680

Table 9 Economic Cost of Quantum of Vehicle Damage due to Accidents

S. No.	Type of Vehicle	Economic Cost of Vehicle Damage (₹)
1	Car	40,088
2	Two Wheeler	10,194
3	Three Wheeler	11,651
4	Bus	1,16,585
5	HCV	1,20,494
6	MCV	2,05,483

6.10 Congestion Effect

The VOC Tables given in **Annex-D** are for uncongested free flow conditions. As traffic volume on a road increases, the vehicles have to overtake, cross, accelerate and decelerate. These maneuvers result in drop in speeds and increase in fuel consumption along with wear and tear of vehicles. The effect of congestion on VOC can be considered separately for the distance-related and time-related components.

The distance-related components are:

The time-related components are:

- (1) Fuel
- (2) Lubricants
- (3) Tyre
- (4) Spare Parts
- (5) Maintenance Labour

- (6) Depreciation
- (7) Fixed costs
- (8) Wages of crew
- (9) Value of passengers time
- (10) Value of commodity in transit

The study conducted in 2011⁴ has yielded updated relationships given in **Table 10** and **11**. This can be used for arriving at factors which in turn can be utilized for multiplying the distance-related and time-related VOC components presented in the Tables at **Annex-D**.

Table 10 Recommended Equations for Time-Related Congestion Effects for Different Vehicle Types on Varying Road Widths

S. No.	Road Type	Cars	Two Wheelers	Buses	LCV	HCV	MCV	
1	Single Lane	CF _T = 0.747 + 1.458* (V/C)	CF _T = 0.911 + 0.807* (V/C)	CF _T = 0.838 + 1.307* (V/C)	CF _T = 0.880 + 1.200* (V/C)	CF _T = 0.858 + 1.101* (V/C)	CF _T = 0.858 + 1.101* (V/C)	
2	Inter- mediate Lane	CF _T = 0.930 + 1.025* (V/C)	CF _T = 0.776 + 0.728* (V/C)	CF _T = 0.942 + 0.670* (V/C)	CF _T = 1.012 + 0.863* (V/C)	CF _T = 0.920 + 1.033* (V/C)	CF _T = 0.920 + 1.033* (V/C)	
3	Two Lane	CF _T = 1.087 + 0.483* (V/C)	CF _T = 0.804 + 0.865* (V/C)	CF _T = 0.864 + 0.543* (V/C)	CF _T = 0.925 + 0.573* (V/C)	CF _T = 0.878 + 0.561* (V/C)	CF _T = 0.878 + 0.561* (V/C)	

S. No.	Road Type	Cars	Two Wheelers	Buses	LCV	HCV	MCV
4	Four Lane Divided Carriage ways	$CF_{T} = 0.4834*$ $(V/C)^{2} + 0.4095*$ $(V/C) + 0.99$	CF _T = 1.1063* (V/C) + 0.99	$CF_{T} = 1.534*$ $(V/C)^{2} - 0.2301*$ $(V/C) + 0.99$	$CF_{T} = 0.8441*$ $(V/C)^{2} + 0.4337*$ $(V/C) + 0.99$	$CF_{T} = 1.1036* (V/C)^{2} + 0.4124* (V/C) + 0.99$	$CF_{T} = 0.3709*$ $(V/C)^{2} + 0.4604*$ $(V/C) + 0.99$
5	Six Lane Divided Carriage ways	$CF_{T} = 2.1947*$ $(V/C)^{2} - 0.3352*$ $(V/C) + 1$	$CF_{T} = 0.8998*$ $(V/C)^{2} + 0.9407*$ $(V/C) + 1$	$CF_{T} = 0.9412*$ $(V/C)^{2} - 0.1881*$ $(V/C) + 1$	$CF_{T} = 0.8441*$ $(V/C)^{2} + 0.4337*$ $(V/C) + 0.99$	$CF_{T} = 1.593*$ $(V/C)^{2} - 0.0523*$ $(V/C) + 1$	CF _T = 1.0234* (V/C) + 1
6	Eight Lane Divided Carriage ways/ Express ways	$CF_{T} =$ -0.2441* $(V/C)^{2}+$ 0.9003* $(V/C) +$ 0.99	CF _T = 0.3973* (V/C) + 1	$CF_{T} =$ -0.0092* (V/C) ² + 0.4559* (V/C) + 1	$CF_{T} =$ -0.1476* $(V/C)^{2}+$ 0.5986* $(V/C)+$ 0.99	$CF_{T} = 0.2143*$ $(V/C)^{2}+$ $0.457*$ $(V/C) + 1$	$CF_{\tau} = -0.373*$ $(V/C)^2 + 0.7575*$ $(V/C) + 1$

Note: CFT: Time-Related Congestion Factor; V/C: Volume - Capacity Ratio.

Table 11 Recommended Equations for Distance-Related Congestion Effects for Different Vehicle Types on Varying Road Widths

S.	Road Type	Cars	Two	Buses	LCV	HCV	MCV
No.			Wheelers				
1	Single Lane	$CF_D = 0.924 +$	CF _D =	CF _D =	CF _D =	CF _D =	CF _D =
		0.680* (V/C)	0.990 +	1.000 +	1.00 +	1.179 +	1.179 +
			0.830*	1.000*	0.90*	0.757*	0.757*
			(V/C)	(V/C)	(V/C)	(V/C)	(V/C)
2	Intermediate	$CF_D = 0.924 +$	CF _D =	CF _D =	CF _D =	CF _D =	CF _D =
	Lane	0.635* (V/C)	0.942 +	0.800 +	0.90 +	1.104 +	1.104 +
			0.118*	1.200*	1.00*	0.755*	0.755*
			(V/C)	(V/C)	(V/C)	(V/C)	(V/C)
3	Two Lane	$CF_D = 0.893 +$	CF _D =	CF _D =	CF _D =	CF _D =	CF _D =
		0.259* (V/C)	0.917 +	0.800	0.9 +	0.925 +	0.900+
			0.112*	+ 1.10*	1.00*	0.482*	1.40*
			(V/C)	(V/C)	(V/C)	(V/C)	(V/C)
4	Four Lane	Small Cars:	CF _D =	CF _D =	CF _D =	CF _D =	CF _D =
	Divided	$CF_D = 2.4405^*$	4.9774*	3.713*	2.2518*	2.8147*	3.6591*
	Carriage	(V/C) ² -2.8919*	(V/C) ²	(V/C) ² -	(V/C) ² -	(V/C) ² -	(V/C) ² -
	ways	(V/C) + 1.8939	-4.8846*	4.2811*	1.2471*	1.5589*	2.0266*
	10	Big Cars: CF _D =	(V/C) +	(V/C) +	(V/C) +	(V/C) +	(V/C) +
		3.713* (V/C) ² -	2.1831	2.2173	1.1348	1.4185	1.8441
		4.2811* (V/C) +					
		2.2173					

S.	Road Type	Cars	Two	Buses	LCV	HCV	MCV
No.			Wheelers				
5	Six Lane Divided Carriage ways	Small Cars: $CF_D = 2.8163^*$ $(V/C)^2 - 3.1278^*$ (V/C) + 1.9629	$CF_{D} = 5.6528*$ $(V/C)^{2}$ $-4.5691*$	$CF_D = 4.3108*$ (V/C) ² - 4.6276*	$CF_{D} = 14.990* (V/C)^{2} -12.014*$	$CF_D = 18.737*$ $(V/C)^2$ -15.017*	CF _D = 24.3581* (V/C) ² -19.522*
		Big Cars: CF _D = 4.3108* (V/C) ² -4.6276* (V/C) + 2.3129	(V/C) + 1.9083	(V/C) + 2.3129	(V/C) + 3.2242	(V/C) + 4.0302	(V/C) + 5.2393
6	Eight Lane Divided Carriage ways/ Express ways	Small Cars: $CF_D = 0.5239^*$ $(V/C)^2 - 0.9289^*$ (V/C) + 1.4847 Big Cars: $CF_D = 0.7734^*$ $(V/C)^2$ -1.3037^* (V/C) + 1.596	$CF_D =$ 2.4879* $(V/C)^2$ -3.9095* $(V/C) +$ 2.6253	$CF_D = 0.7734*$ $(V/C)^2 - 1.3037*$ (V/C) + 1.596	CF _D = 0.7707* (V/C) ² -0.7214* (V/C) + 1.0232	$CF_D = 0.9634*$ $(V/C)^2$ -0.9018* (V/C) + 1.279	$CF_D = 1.2524*$ $(V/C)^2$ $-1.1723*$ $(V/C) + 1.6627$

Note: CF_p: Distance-Related Congestion Factor; V/C: Volume - Capacity Ratio.

The Volume - Capacity (V/C) ratios in the equations given in **Table 10** and **11** can be worked out from capacity of various road widths as given in latest relevant IRC code or other relevant documents.

It should be noted that congestion occurs most severely in the peak hours and less severely during the rest of the day. The hourly traffic variation on the road will then determine the appropriate congestion factors. For the determination of both distance and time-related congestion factors, information on peak hourly traffic flow in terms of PCU is essential. When such information is lacking or not available normally, 8-10 percent of daily traffic volume is considered to represent the peak hourly traffic flow. The congestion factors obtained on the basis of peak hourly traffic are true only to the peak hour conditions and it is inappropriate if the congestion factors are used for 24 hours. Therefore, a correction factor would have to be applied to obtain a realistic value.

To arrive at a correction factor traffic census data available for typical sections of National Highways can be utilized in deriving a factor. From this data, the percentage of traffic for each hour can be established. For example, capacity of two lane road in plain terrain is 30,000 PCU/day¹¹ and this can be distributed over the 24-hour period in accordance with appropriate congestion period duration found from the data. The distance and time-related congestion factors can be computed accordingly using the equations given in **Table 10** and **11** for the different categories of traffic.

6.11 Benefits from Low Volume Roads

In the case of low volume rural roads, like village roads, the quantification of benefits due to the savings in VOC is not the correct approach for economic analysis. This is because the number of vehicles using village roads is very insignificant which can be as low as 200 vehicles per day. Considering this, it is prudent to assess the benefits on the basis of Producer Surplus. This approach expresses the project benefits directly rather than indirectly i.e. in terms of

value of net output and income rather than in terms of savings accrued to road users. This production-oriented interpretation of project benefits is consistent with the present mandate of the government focusing on accelerated rural development through the Pradhan Mantri Gram Sadak Yojana (PMGSY) because it focuses directly on farm level changes and augmentation of road connectivity to villages. The application of the producer surplus approach means that a significant statistical and other data collection effort is needed to obtain the following:

- (a) an accurate description of the principal economic activities (which may largely fall in the primary sector) and production techniques and conditions;
- (b) an assessment of the minimum incremental amount of expenditure needed to generate increased output in the given economic activities;
- (c) estimates of changes in yields, farm gate and market prices (for agricultural produce);and
- (d) determination of marketable surpluses taking into account farmer's own consumption, requirement for seeds, fodder etc.

This statistical effort need to be supplemented with farm budgeting-costing. The value added approach focuses on the difference in the net income of producers (by economic activity) and transporters "with" and "without" the road investment and the complementary incremental investments and expenditure (operating and maintenance costs for generating production) in each sector/sub-sector of the economy. Since this is an "economic" approach, all the expenditures related to project and revenues should reflect economic costs (i.e. shadow or accounting prices) which infer and allow for transfer of payments, subsidies and other distortions in prevailing market prices.

By definition, the value added approach does not focus on the financial incentives generated by proposed rural investments. These incentives are, however, critical to the viability of projects and merit considerable attention in the appraisal process.

6.12 Benefits from Construction of a Large Bridge Project

In bridge project appraisal, it is important first to study the present traffic flow pattern. It may comprise of the following:

- (i) Service across the river by a small ferry, carrying passengers and light vehicles, and/
- (ii) Detouring of vehicles by alternate route, generally over long distance

This will be followed by forecast of average daily traffic over the proposed bridge for the time horizon of the study. This will represent the normal traffic growth and the volume generated by the proposed bridge. The main elements of traffic required for economic analysis are as follows:

- A. Ferry Traffic
 - i) Normal growth
 - ii) Volume generated by the proposed bridge
- B. Diverted Road Traffic (from alternate route)
 - i) Normal growth
 - ii) Volume generated by the proposed bridge

- **6.12.1** *Project Costs:* The project costs basically include
- (i) Capital costs, annually phased over the construction period
- (ii) Recurring and maintenance costs and
- (iii) The sum of (i) and (i) will be the total cost of the project.
- **6.12.2** Project Benefits: The economic appraisal consists primarily of determining the least cost solution to the problem of moving traffic across the river. Two alternatives, bridge and ferry, differ not only in capital and operating costs, but also in the quality of services in that, ferry takes more time and is less convenient. As a result, the traffic levels would, in fact, differ substantially under the two alternatives. The benefits accruing due to the bridge, in case of ferry alternative without any diversion of traffic by alternate route primarily consists of the avoidance of the ferry capital and operating costs and the elimination of delays for vehicles, drivers, passengers and goods. These will be calculated as the time savings for road traffic.

In the case of alternate route, VOC and time savings for the diverted traffic (both passengers and goods) would also form part of the benefit streams.

- **6.12.3** Ferry Costs: The capital costs will be for the ferry system as a whole, *i.e.* including the cost of vessel and the terminal facilities. Similarly, the cost of operation will be for both ferry and terminal. These costs will be worked out for the normal traffic.
- **6.12.4** Elimination of Delay: Assuming reasonably efficient ferry services, the difference between it and the drive across the proposed bridge need to be determined. It should be determined taking into account the waiting time for the ferry and boarding and alighting time for passengers and goods as well as vehicles. Based on the normal growth in traffic, annual time savings must be worked out and valued in monetary terms.
- 6.12.5 Vehicle Operating Costs (VOC): As already indicated in the manual, Vehicle Operating Costs (VOC) will be worked out under two scenarios namely "with" and "without" project condition. Under "without project condition", the VOC will be determined year by year, on the existing route with the given value of rise and fall, roughness, traffic volume and composition and the travel distance (lead) whereas under "with project" condition, VOC will be determined for the proposed route taking into account all the above road and traffic characteristics. VOC savings in "with project condition" will arise first, due to short distance and secondly, on account of less congestion.

6.13 Benefits from Replacement of Railway Level Crossings by Road Over-Bridge (ROB)

The benefits from the replacement of Railway Level Crossings by ROBs are as under:

- Travel Time savings of passengers for the duration of the closure of the gates and immediately after opening of the gates.
- Value of commodity in transit detained for the duration of closure of the gates and immediately after opening of the gates.
- Savings in idle fuel consumption
- Savings in the cost of maintenance of the level crossing (wages of gateman etc).
- Savings due to prevention of accidents, if such data is available from past records.

The expected increase in road traffic coupled with increase in railway closures should be considered over the analysis period and the possibility of doubling of track leading to more closures should be considered. For performing economic viability of constructing the ROB, the relevant information like number of times of gate closure and duration may be collected during the traffic surveys for the estimation of benefits.

7. TECHNIQUES OF ECONOMIC EVALUATION

7.1 Study of Alternatives

It has been emphasized that in the earlier studies^{1,9,18,19,29} that economic analysis is carried out to determine the most realistic solution from among a number of alternatives. Thus the analyst must visualize the various alternatives that are possible, including the "do-nothing" or "null" alternative, and evaluate each of the alternatives against the "do-nothing" alternative. The results will enable him to determine whether each of the alternatives is worthwhile at all and to rank the alternatives in the order of their attractiveness.

7.2 Marginal or Incremental Analysis

Apart from carrying out the analysis of each of the alternatives against the "do-nothing" alternative, the analyst should also carry out marginal or incremental analysis from one alternative to the other. To illustrate this, let us consider a two-lane road which needs pavement strengthening. Traffic forecasts may indicate that the carriageway needs widening to four lane divided carriageway as well in the next few years. Thus four alternatives present themselves as follows:

Alternative 1: Do nothing

Alternative 2: Strengthening two-lane pavement

Alternative 3: Strengthening two-lane pavement now and widening the carriageway to four lanes when it is due

Alternative 4: Strengthening two-lane pavement now and widening the carriageway to four lanes right now.

The above alternatives are in the order of their increasing present costs. The analyst must carry out incremental analysis of:

Analysis (1): Alternative 2 against Alternative 1

Analysis (2): Alternative 3 against Alternative 2

Analysis (3): Alternative 4 against Alternative 3

The results will establish whether the incremental investments will yield the desired benefits.

7.3 Methods of Economic Evaluation

Three common methods of economic evaluations normally adopted are as follows:

(1) Net Present Value Method

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- (2) Benefit Cost Ratio Method
- (3) Internal Rate of Return Method

All the three methods are based on the Discounted Cash Flow (DCF) technique of discounting all future costs and benefits to a common year.

7.4 Net Present Value (NPV) Method

In this method, the stream of costs/benefits associated with the project over an extended period of time is calculated and is discounted at a selected discounted rate to give the present value. Benefits are treated as positive and costs as negative and the summation give the Net Present Value (NPV). Any project with positive NPV is treated as acceptable. In comparing more than one project, a project with the higher NPV should be accepted. The NPV is algebraically expressed as:

$$NPV_0 = (B_0 - C_0) + \frac{(B_1 - C_1)}{(i+1)^1} + \frac{(B_2 - C_2)}{(i+1)^2} + \dots + \frac{(B_n - C_n)}{(i+1)^n}$$

Where

 NPV_0 = Net Present Value in the year 0

 B_t = Value of benefits which occur in the year t

 C_t = Value of costs which occur in the year t

i = discount rate per annum in decimals

n = number of years taken for analysis

The method is illustrated using a simple example given below:

Example 7:

The cost of improving an existing road, 25 km long, is ₹ 4.00 lakh per km. Road user costs (with and without the improvements), accident costs (with and without the improvements) and maintenance costs (with and without the improvements) are given in **Table 12** for a 10-year period after the completion of the improvements. Assuming a discount rate of 10 percent, find out whether the project is economically justifiable? Use the NPV method.

Solution:

The calculations are presented in **Table 12**.

Cost of improvements (C,) = 25 x ₹ 4 = ₹ 100 lakh

NPV = (+ ₹ 165.4 - ₹ 100) lakh = ₹ 65.4 lakh

Since the NPV is positive, the project is economically justified.

Table 12 Road User Costs, Accident Costs and Maintenance Costs (with and without the improvements) to Calculate NPV

	Road User Costs		Accident Costs		Maintenance Costs		Benefits (B _t)			
Year (t)	With Impr.	Without Impr.	With Impr.	Without Impr.	With Impr.	Without Impr.	Cols [3+5+7]- Cols [2+4+6]	B _t -C _t	B _t -C _t (I+0.1)*t	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
0	-	-	-	-	-	-	-	-100.0	-100.0	
1	105.5	126.5	1.1	3.1	3.5	2.5	22.0	22.0	+20.0	
2	110.3	132.2	1.1	3.1	3.5	2.5	23.1	23.1	+19.1	
3	115.8	138.9	1.2	3.5	3.5	2.5	24.4	24.4	+18.4	
4	121.6	145.8	1.2	3.7	3.5	2.5	25.7	25.7	+17.6	
5	127.6	153.0	1.3	3.8	3.5	2.5	26.9	26.9	+16.7	
6	134.0	161.0	1.3	4.0	3.5	2.5	28.7	28.7	+16.2	
7	140.7	168.9	1.4	4.2	3.5	2.5	30.0	30.0	+15.4	
8	147.8	177.0	1.5	4.4	3.5	2.5	31.1	31.1	+14.5	
9	155.1	186.2	1.6	4.7	3.5	2.5	33.2	33.2	+14.1	
10	162.9	195.2	1.6	4.9	3.5	2.5	34.6	34.6	+13.4	
All Figures in ₹ Lakh								+165.4		
									-100.0	

7.5 Benefit-Cost (B/C) Ratio Method

There are a number of variations of this method, but a simple procedure is to discount all costs and benefits to their present worth and calculate the ratio of the benefits to costs. Negative flows are considered as costs whereas positive flows as benefits. Thus the savings in the transport costs are considered as benefits. If the B/C ratio is more than one, the project is worth undertaking. The B/C method is illustrated using a simple example.

Example 8:

An existing single lane road, 30 km long, is to be widened to two lanes. The cost of widening is ₹ 10 lakh per km. The vehicle operating costs, accident costs and maintenance costs, with and without widening, for a 10 year period are presented in **Table 13**. The discount rate is 12 percent. Is the project worthwhile?

Solution:

The calculations are presented in **Table 13**.

Cost of the Project = 30 x ₹ 10 lakh = ₹ 300 lakh

Benefit/Cost ratio = 380.8/300 = 1.27 greater than 1

Hence the project is economically justified.

Table 13 Road User Costs, Accident Costs and Maintenance Costs (with and without the improvements) to Calculate B/C Ratio

	Road User Costs		Accident Costs		700000000000000000000000000000000000000	tenance osts	Benefits (B,)	B,	
Year (t)	With Impr.	Without Impr.	With Impr.	Without Impr.	With Impr.	Without Impr.	Cols [3+5+7]- Cols [2+4+6]	(Present Net Worth)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
1	101.5	160.7	2.5	3.6	10.0	7.5	57.8	51.6	
2	105.6	168.2	2.6	3.7	10.0	7.5	61.2	48.8	
3	110.2	176.3	2.7	3.8	10.0	7.5	64.7	46.1	
4	116.2	185.2	2.8	3.9	10.0	7.5	67.6	43.0	
5	122.3	190.0	2.9	4.0	10.0	7.5	66.3	37.6	
6	128.4	199.5	2.9	4.0	10.0	7.5	69.7	35.3	
7	135.6	210.0	3.0	4.1	10.0	7.5	73.0	33.0	
8	143.2	219.5	3.1	4.2	10.0	7.5	74.9	30.3	
9	149.1	228.2	3.2	4.3	10.0	7.5	77.7	28.0	
10	154.6	240.1	3.2	4.3	10.0	7.5	84.1	27.1	
All Figur	es in₹ Lak	rh					Total	380.8	

7.6 Internal Rate of Return (IRR) Method

The internal rate of return is the discount rate which makes the discounted future benefits equal to the initial outlay. In other words, it is the discount rate which makes the stream of cash flows to zero. Equation in para 7.4 can be rearranged as below (B_{\circ} being zero):

$$C_0 = \frac{(B_1 - C_1)}{(i+1)^1} + \frac{(B_2 - C_2)}{(i+1)^2} + \dots + \frac{(B_n - C_n)}{(i+1)^n}$$
$$= \sum_{j=1}^n \frac{(B_j - C_j)}{(i+1)^j}$$

The solution to the above equation can be done by trial and error, a rather tedious process. However, the task of computing IRR is rendered very simple now-a-days due to the availability of this function as an in inbuilt one in many computer software.

If the internal rate of return calculated from the above formula is greater than the rate of interest obtainable by investing the capital in the open market, the scheme is considered acceptable.

7.7 Comparison of the Various Methods of Economic Evaluation

The three methods of economic evaluation described above have their own advantages and short-comings. The B/C ratio method is very widely used by the highway engineers. It, however, suffers from the following drawbacks:

- (1) It requires an assumption of a discount rate, which should bear relation to the opportunity cost of capital. It is, however, rather difficult to know the opportunity cost of capital accurately.
- (2) The significance of the B/C ratio is ambiguous, and its relative value is difficult to understand and interpret. For instance, if there are two proposals, one with a B/C ratio of 1.05 and the other with a ratio of 1.10, the difference is very difficult to appreciate.
- (3) It is somewhat confusing and difficult to decide which items should be termed as costs and placed in the denominator and which as benefits and placed in the numerator.

The IRR method is popular with international lending agencies like the World Bank. It lends itself admirably well for use in a computer-aided design model. It avoids the need for selecting a discount rate initially. The rate derived from computations can be easily compared with the market rate of interest, with which economists, financial experts and bankers are familiar. Its disadvantage is that the computations are tedious and a solution can be obtained only by trial and error. The NPV method suffers from the same disadvantage of B/C ratio method that a rate of discount has to be assumed.

7.8 Selection of Discount Rate

As seen from the discussions above, the selection of an appropriate discount rate (or interest rate) is crucial in the B/C ratio and NPV methods.

The choice of the discount rate is governed by a number of complex factors and is dependent on the future availability of finance and the various opportunities for its use. The attitude of the society towards present consumption as against savings for future is an important factor. Will the present generation prefer to consume the resources now or conserve it for future use by the current or future generation? The answer to this question will give the "social time preference rate of interest". Another approach is to find out the social yield that the resources employed by a marginal public project would have otherwise generated. This determines the "social opportunity cost rate of interest". In a truly competitive economy, the two rates of interest would be equal and investments and consumption would then be ideally allocated. But such a situation is difficult to find, and more so in a developing country where capital is very scarce. In such situations, some general guidelines can be given for selecting an appropriate discount rate. Such a rate should not be less than the rate of borrowing or lending by the Government or the market rate of interest. A rate of 12 percent is used by the Planning Commission^{20,21}.

A typical worked out example given below explains the various steps involved in the economic analysis.

Example 9:

A two-lane black topped road with earthen shoulders passing through a congested town has the following daily traffic in the year 2019:

Small Cars	:	3131
Big Cars	:	1563
Buses	:	618
Heavy Commercial Vehicles (HCV)	:	618
Multi-Axle Heavy Commercial Vehicles (MCV)	:	618
Light Commercial Vehicles (LCV)	:	1482
Two Wheelers	:	4323

An Origin-Destination (O-D) Survey has revealed that the following percentages of traffic are bypassable as presented in **Table 14**.

S. No. **Vehicle Type** % Bypassable Traffic 1 Cars 35 2 Buses 50 40 3 Two Axle Heavy Commercial Vehicles 4 Multi-Axle Heavy Commercial Vehicles 60 5 45 **Light Commercial Vehicles** 6 Two Wheelers 15

Table 14 Percentage of Bypassable Traffic

The roughness of the road through the town is 4000 mm/km and is maintained at the same status by carrying out routine repairs and renewals. The road is in plain terrain with RF = 0 m/km.

It is proposed to construct a bypass to the town with a two lane asphalt pavement 7.0 m wide with 1.5 m black topped shoulders on either side. The roughness of the new pavement will be 2000 mm/km and this value will be maintained through routine maintenance and renewals. In case of existing road while construction, the same roughness of 4000 mm/km will be maintained during construction and after opening of bypass, this value will be maintained at 2000 mm/km.

The estimated cost of construction of the bypass is ₹ 110 crores which is to be incurred spread over a period of four years given as below:

Year	Spread of Quantum of Investment (in %)
2019	10
2020	20
2021	30
2022	40

Traffic growth rate is expected to be 9 percent per annum for all vehicle types. Maintenance cost per km is as under:

Existing road through the town : ₹3,50,000 per km/year

Bypass : ₹3,50,000 per km/year

Similarly, the maintenance cost to be incurred for the existing road after the opening of the bypass road would be ₹ 3,50,000 per km per year. The length of the existing road through the town is 10 km and the proposed bypass length is 11 km. The tax element in construction and maintenance may be taken as 10 percent in all the above cases. The accident costs and value of passenger time may be ignored in the calculations.

Calculate the IRR considering 15 year analysis period i.e. 15 year period after opening the road to traffic may be assumed. The capacity of the road is 3,000 PCU/hr, which corresponds to a maximum daily flow of 30,000 PCU with peak hour traffic of 10 percent of daily traffic.

Solution:

The calculation of Internal Rate of Return for the proposal of constructing bypass involves the following steps:

Step 1: To convert the given traffic data in terms of PCU for the given alternative proposals include the following:

Case I: 'Do Nothing Case': The traffic on the existing road alone is plying.

Case II: After bypass is constructed, the existing road is used by partial traffic.

Case III: The traffic using newly constructed bypass road after it is opened for traffic after a period of four years.

To facilitate the calculation of traffic volume for each of the above scenarios, the percentage of traffic using bypass road is made available as basic data given in **Table 15**.

Step 2: To calculate yearly traffic volume in terms of PCU/day with a 9 percent growth rate from the year 2019 to 2037. And the 10 percent of this daily traffic is considered as peak hourly traffic for the purpose of calculating distance-related and time-related congestion factors. Both these congestion factors are to be calculated for a rise and fall (RF) value of '0' m/km and roughness (RG) of 4000 mm/km.

Step 3: The distance-related and time-related congestion factors are separately calculated and are corrected by multiplying a factor of 0.125. This is to consider the effect of congestion assuming that it spreads over 3 hours out of 24 hours.

Step 4: Total Vehicle Operating Costs are calculated for the above three cases using the economic costs of VOC given in Updated Road User Cost study conducted by CRRI⁴ and the Congestion Factors determined in Step 3.

Step 5: IRR is calculated using the data developed in Steps 1 to 4.

The typical calculations involved in the computations have been described in this paragraph. The conversion of vehicles into PCU in this example problem is taken from IRC:64-1990¹¹. The user can adopt any other set of PCU factors as per the relevant IRC code. The traffic volume data in terms of PCU for all the three envisaged scenarios is presented in **Table 15**. The traffic data calculated from the year 2019 to 2037 considering traffic growth rate of 9% for all the three cases stated in Step 1 is tabulated in **Tables 16**, **17** and **18**. Assuming 10% of total daily traffic to represent the peak hourly traffic, the ratio of this traffic volume and the capacity of two lane road i.e. 3000 PCU/Hr (as per IRC:64) is calculated and tabulated in the last column on **Tables 16**, **17** and **18**. It should be noted that the Volume - Capacity (V/C) ratio logically cannot exceed 1 and if any value is greater than 1, it should be equated to 1.

Table 15 Traffic Volume Data (2019)

S. No.	Type of Vehicle	Number of vehicles per day on existing road (Case I)	Traffic Volume in terms of PCU/day	Traffic Bypass- able (in %)	Balance Traffic using existing road (Case II)	Bypass- able Traffic (Case III)
1	Small Cars	3131	3131	35	2035	1096
2	Big Cars	1563	1563	35	1016	547
3	Two Wheelers	4323	2162	15	1838	324
4	Buses	618	1854	50	927	927
5	Light Commercial Vehicles (LCV)	1482	2223	45	1223	1000
6	Heavy Commercial Vehicles (HCV)	618	1854	40	1112	742
7	Multi-Axle Heavy Commercial Vehicles (MCV)	618	2781	60	1112	1669

Table 16 Traffic Volume on the Existing Road (Case I)

Year	Small	Big	TW	Buses	LCV	HCV	MCV	PCU/Hr	V/C
	Cars	Cars							Ratio
2019	3131	1563	4323	618	1482	618	618	1557	0.52
2020	3413	1704	4712	674	1615	674	674	1697	0.57
2021	3720	1857	5136	735	1760	735	735	1850	0.62
2022	4055	2024	5598	801	1918	801	801	2017	0.67
2023	4420	2206	6102	873	2091	873	873	2198	0.73
2024	4818	2405	6651	952	2279	952	952	2396	0.80
2025	5252	2621	7250	1038	2484	1038	1038	2612	0.87
2026	5725	2857	7903	1131	2708	1131	1131	2847	0.95
2027	6240	3114	8614	1233	2952	1233	1233	3104	1.00
2028	6802	3394	9389	1344	3218	1344	1344	3383	1.00
2029	7414	3699	10234	1465	3508	1465	1465	3687	1.00
2030	8081	4032	11155	1597	3824	1597	1597	4020	1.00
2031	8808	4395	12159	1741	4168	1741	1741	4382	1.00
2032	9601	4791	13253	1898	4543	1898	1898	4776	1.00
2033	10465	5222	14446	2069	4952	2069	2069	5206	1.00
2034	11407	5692	15746	2255	5398	2255	2255	5675	1.00
2035	12434	6204	17163	2458	5884	2458	2458	6185	1.00
2036	13553	6762	18708	2679	6414	2679	2679	6742	1.00
2037	14773	7371	20392	2920	6991	2920	2920	7349	1.00

Table 17 Traffic Volume on Existing Road after Opening of Bypass (Case II)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	PCU/Hr	V/C Ratio
2019	3131		4222	610	1400	610	610	1557	
		1563	4323	618	1482	618	618	1557	0.52
2020	3413	1704	4712	674	1615	674	674	1697	0.57
2021	3720	1857	5136	735	1760	735	735	1850	0.62
2022	4055	2024	5598	801	1918	801	801	2017	0.67
2023	2873	1434	5188	436	1150	523	348	1307	0.44
2024	3132	1563	5655	475	1254	570	379	1424	0.47
2025	3414	1704	6164	518	1367	621	413	1553	0.52
2026	3721	1857	6719	565	1490	677	450	1692	0.56
2027	4056	2024	7324	616	1624	738	491	1845	0.62
2028	4421	2206	7983	671	1770	804	535	2011	0.67
2029	4819	2405	8701	731	1929	876	583	2191	0.73
2030	5253	2621	9484	797	2103	955	635	2388	0.80
2031	5726	2857	10338	869	2292	1041	692	2603	0.87
2032	6241	3114	11268	947	2498	1135	754	2838	0.95
2033	6803	3394	12282	1032	2723	1237	822	3093	1.00
2034	7415	3699	13387	1125	2968	1348	896	3371	1.00
2035	8082	4032	14592	1226	3235	1469	977	3674	1.00
2036	8809	4395	15905	1336	3526	1601	1065	4005	1.00
2037	9602	4791	17336	1456	3843	1745	1161	4365	1.00

Table 18 Traffic Volume on the Proposed Bypass Road (Case III)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	PCU/Hr	V/C Ratio
2019	0	0	0	0	0	0	0	0	0.00
2020	0	0	0	0	0	0	0	0	0.00
2021	0	0	0	0	0	0	0	0	0.00
2022	0	0	0	0	0	0	0	0	0.00
2023	1547	772	914	437	941	350	525	891	0.30
2024	1686	842	996	477	1025	382	573	972	0.32
2025	1838	917	1086	520	1117	417	625	1060	0.35
2026	2004	1000	1184	566	1218	454	681	1155	0.39
2027	2184	1090	1290	617	1328	495	742	1259	0.42
2028	2381	1188	1406	673	1448	540	809	1372	0.46
2029	2595	1294	1533	734	1579	589	882	1496	0.50
2030	2828	1411	1671	800	1721	642	962	1631	0.54
2031	3082	1538	1821	872	1876	700	1049	1778	0.59
2032	3360	1677	1985	951	2045	763	1144	1939	0.65

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	PCU/Hr	V/C Ratio
2033	3662	1828	2164	1037	2229	832	1247	2113	0.70
2034	3992	1993	2359	1130	2430	907	1359	2304	0.77
2035	4352	2172	2571	1232	2649	989	1481	2511	0.84
2036	4744	2367	2803	1343	2888	1078	1614	2737	0.91
2037	5171	2580	3056	1464	3148	1175	1759	2983	0.99

Calculation of Congestion Factors

VOC tables given in the CRRI study report⁴ on Updation of Road User Cost Data have been used in this analysis. The distance and time-related congestion factors are calculated separately and the typical calculations are presented for cars. The Congestion Factors are determined for 'Do Nothing Case' and evaluating the same against the bypass road alternative coupled with comparison of traffic on the existing road after the opening of bypass road.

Distance-Related Congestion Factor

From **Table 16**, the Volume-Capacity (V/C) ratio for the year 2019 is 0.52. From **Table 11**, Congestion Factor (CF_D) for distance-related VOC for two lane road section is determined as follows:

$$CF_D = 0.893 + 0.259 * (V/C)$$

= 0.893 + 0.259 * 0.52 = 1.028

In accordance with Step 3, this value is multiplied by a factor of 0.125 to obtain the corrected Distance-related Congestion Factor.

However, it is to be noted that whenever the CF_D values are less than 1, it may be taken as 1 as done in this sample exercise. The value of CF_D logically is limited to a minimum of 1 and a maximum of 2. These values are given in **Tables 19, 20** and **21**.

Time-Related Congestion Factor

From **Table 16**, the Volume-Capacity (V/C) ratio for the year 2019 is 0.52. From **Table 10**, Congestion Factor (CF_T) for time-related VOC for two lane road section is determined as follows:

$$CF_{T} = 1.087 + 0.483* (V/C)$$

= 1.087 + 0.483* 0.52 = 1.338

In accordance with Step 3, this value is multiplied by a factor of 0.125 to obtain the corrected Time-related Congestion Factor.

Time-related Congestion Factor (
$$CF_{\tau}$$
) = 1.338 x 0.125 = 0.17

However, it is to be noted that whenever the CF_{T} values are less than 1, it may be taken as 1 as done in this sample exercise. The value of CF_{T} logically is limited to a minimum of 1 and a maximum of 2. These values are given in **Tables 22, 23** and **24**.

Table 19 Distance-Related Corrected Congestion Factors for Case I

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.37	1.42	1.18	1.18
2020	1.00	1.00	1.00	1.42	1.47	1.20	1.20
2021	1.00	1.00	1.00	1.48	1.52	1.22	1.22
2022	1.00	1.00	1.00	1.54	1.57	1.25	1.25
2023	1.00	1.00	1.00	1.61	1.63	1.28	1.28
2024	1.00	1.00	1.00	1.68	1.70	1.31	1.31
2025	1.00	1.00	1.00	1.76	1.77	1.34	1.34
2026	1.00	1.00	1.00	1.84	1.85	1.38	1.38
2027	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2028	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2029	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2030	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2031	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2032	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2033	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2034	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2035	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2036	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2037	1.00	1.00	1.00	1.90	1.90	1.41	1.41

Table 20 Distance-Related Corrected Congestion Factors for Case II

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.37	1.42	1.18	1.18
2020	1.00	1.00	1.00	1.42	1.47	1.20	1.20
2021	1.00	1.00	1.00	1.48	1.52	1.22	1.22
2022	1.00	1.00	1.00	1.54	1.57	1.25	1.25
2023	1.00	1.00	1.00	1.28	1.34	1.13	1.13
2024	1.00	1.00	1.00	1.32	1.37	1.15	1.15
2025	1.00	1.00	1.00	1.37	1.42	1.17	1.17
2026	1.00	1.00	1.00	1.42	1.46	1.20	1.20
2027	1.00	1.00	1.00	1.48	1.52	1.22	1.22
2028	1.00	1.00	1.00	1.54	1.57	1.25	1.25
2029	1.00	1.00	1.00	1.60	1.63	1.28	1.28
2030	1.00	1.00	1.00	1.68	1.70	1.31	1.31
2031	1.00	1.00	1.00	1.75	1.77	1.34	1.34
2032	1.00	1.00	1.00	1.84	1.85	1.38	1.38
2033	1.00	1.00	1.00	1.90	1.90	1.41	1.41

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2034	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2035	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2036	1.00	1.00	1.00	1.90	1.90	1.41	1.41
2037	1.00	1.00	1.00	1.90	1.90	1.41	1.41

Table 21 Distance-Related Corrected Congestion Factors for Case III

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2020	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2021	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2022	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2023	1.00	1.00	1.00	1.13	1.20	1.07	1.07
2024	1.00	1.00	1.00	1.16	1.22	1.08	1.08
2025	1.00	1.00	1.00	1.19	1.25	1.10	1.10
2026	1.00	1.00	1.00	1.22	1.29	1.11	1.11
2027	1.00	1.00	1.00	1.26	1.32	1.13	1.13
2028	1.00	1.00	1.00	1.30	1.36	1.15	1.15
2029	1.00	1.00	1.00	1.35	1.40	1.17	1.17
2030	1.00	1.00	1.00	1.40	1.44	1.19	1.19
2031	1.00	1.00	1.00	1.45	1.49	1.21	1.21
2032	1.00	1.00	1.00	1.51	1.55	1.24	1.24
2033	1.00	1.00	1.00	1.57	1.60	1.26	1.26
2034	1.00	1.00	1.00	1.64	1.67	1.30	1.30
2035	1.00	1.00	1.00	1.72	1.74	1.33	1.33
2036	1.00	1.00	1.00	1.80	1.81	1.36	1.36
2037	1.00	1.00	1.00	1.89	1.89	1.40	1.40

Table 22 Time-Related Corrected Congestion Factors for Case I

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.15	1.22	1.17	1.17
2020	1.00	1.00	1.00	1.17	1.25	1.20	1.20
2021	1.00	1.00	1.00	1.20	1.28	1.22	1.22
2022	1.00	1.00	1.00	1.23	1.31	1.26	1.26
2023	1.00	1.00	1.00	1.26	1.34	1.29	1.29
2024	1.00	1.00	1.00	1.30	1.38	1.33	1.33
2025	1.00	1.00	1.00	1.34	1.42	1.37	1.37

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2026	1.00	1.00	1.00	1.38	1.47	1.41	1.41
2027	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2028	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2029	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2030	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2031	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2032	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2033	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2034	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2035	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2036	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2037	1.00	1.00	1.00	1.41	1.50	1.44	1.44

Table 23 Time-Related Corrected Congestion Factors for Case II

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.15	1.22	1.17	1.17
2020	1.00	1.00	1.00	1.17	1.25	1.20	1.20
2021	1.00	1.00	1.00	1.20	1.28	1.22	1.22
2022	1.00	1.00	1.00	1.23	1.31	1.26	1.26
2023	1.00	1.00	1.00	1.10	1.17	1.12	1.12
2024	1.00	1.00	1.00	1.12	1.20	1.14	1.14
2025	1.00	1.00	1.00	1.15	1.22	1.17	1.17
2026	1.00	1.00	1.00	1.17	1.25	1.19	1.19
2027	1.00	1.00	1.00	1.20	1.28	1.22	1.22
2028	1.00	1.00	1.00	1.23	1.31	1.25	1.25
2029	1.00	1.00	1.00	1.26	1.34	1.29	1.29
2030	1.00	1.00	1.00	1.30	1.38	1.32	1.32
2031	1.00	1.00	1.00	1.34	1.42	1.36	1.36
2032	1.00	1.00	1.00	1.38	1.47	1.41	1.41
2033	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2034	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2035	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2036	1.00	1.00	1.00	1.41	1.50	1.44	1.44
2037	1.00	1.00	1.00	1.41	1.50	1.44	1.44

Table 24 Time-Related Corrected Congestion Factors for Case III

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2020	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2021	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2022	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2023	1.00	1.00	1.00	1.03	1.10	1.04	1.04
2024	1.00	1.00	1.00	1.04	1.11	1.06	1.06
2025	1.00	1.00	1.00	1.06	1.13	1.08	1.08
2026	1.00	1.00	1.00	1.07	1.15	1.09	1.09
2027	1.00	1.00	1.00	1.09	1.17	1.11	1.11
2028	1.00	1.00	1.00	1.11	1.19	1.13	1.13
2029	1.00	1.00	1.00	1.13	1.21	1.16	1.16
2030	1.00	1.00	1.00	1.16	1.24	1.18	1.18
2031	1.00	1.00	1.00	1.19	1.26	1.21	1.21
2032	1.00	1.00	1.00	1.21	1.30	1.24	1.24
2033	1.00	1.00	1.00	1.25	1.33	1.27	1.27
2034	1.00	1.00	1.00	1.28	1.37	1.31	1.31
2035	1.00	1.00	1.00	1.32	1.40	1.35	1.35
2036	1.00	1.00	1.00	1.36	1.45	1.39	1.39
2037	1.00	1.00	1.00	1.40	1.49	1.44	1.44

Vehicle Operation Cost

Distance-Related and Time-Related Vehicle Operation Costs are calculated using the economic cost data available from Table VOC Small Cars 17 and 15 in **Annex-D**, for uncongested conditions for Roughness of 4000 and 2000 mm/km respectively.

Distance-related VOC costs for uncongested condition from Table VOC Small Cars 17 for Roughness of 4000 mm/km and RF of 0 m/km presented in **Annex-D** are as given below:

Fuel Cost	₹ 2.15
Spare Parts Cost	₹ 0.41
Maintenance Cost	₹ 0.74
Tyre Cost	₹ 0.22
Engine Oil Cost	₹ 0.42
Other Oil Cost	₹ 0.05
Grease Cost	₹ 0.05
Total	₹ 4.03/km

Distance-Related Vehicle Operation Cost for congested conditions

- = VOC for uncongested condition x CF_D
- = ₹4.03 x 1.00
- = ₹4.03/km

Similarly, Time-Related economic costs for uncongested condition from Table VOC Small Cars 17 for Roughness of 4000 mm/km and RF of 0 m/km presented in **Annex-D** are as given below:

Fixed Cost ₹ 0.99

Depreciation Cost ₹ 0.11

Passenger Time Cost ₹ 5.52

Total ₹ 6.62

Time-Related Vehicle Operation Cost for congested condition

= VOC for uncongested condition x CF_T

= ₹6.62 x 1.00

= ₹ 6.62/km

Total of Distance-Related and Time-Related VOC per kilometer is

= ₹. 4.03 + 6.62/km

= ₹ 10.65/km

These values are tabulated in Tables 25, 26 and 27.

Table 25 Vehicle Operation Cost (VOC) for Case I (in ₹ per km)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	10.66	10.91	3.10	23.76	27.63	30.20	43.62
2020	10.66	10.91	3.10	24.47	28.39	30.84	44.51
2021	10.66	10.91	3.10	25.36	29.16	31.35	45.25
2022	10.66	10.91	3.10	26.25	29.93	32.25	46.50
2023	10.66	10.91	3.10	27.26	30.76	33.02	47.62
2024	10.66	10.91	3.10	28.34	31.80	33.92	48.87
2025	10.66	10.91	3.10	29.53	32.84	34.82	50.13
2026	10.66	10.91	3.10	30.72	34.10	35.85	51.62
2027	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2028	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2029	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2030	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2031	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2032	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2033	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2034	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2035	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2036	10.66	10.91	3.10	31.62	34.87	36.62	52.73
2037	10.66	10.91	3.10	31.62	34.87	36.62	52.73

Table 26 Vehicle Operation Cost (VOC) for Case II (in ₹ per km)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	10.66	10.91	3.10	23.76	27.63	30.20	43.62
2020	10.66	10.91	3.10	24.47	28.39	30.84	44.51
2021	10.66	10.91	3.10	25.36	29.16	31.35	45.25
2022	10.66	10.91	3.10	26.25	29.93	32.25	46.50
2023	9.09	9.07	2.76	21.21	25.59	26.88	38.52
2024	9.09	9.07	2.76	21.78	26.22	27.36	39.21
2025	9.09	9.07	2.76	22.51	26.82	27.96	40.03
2026	9.09	9.07	2.76	23.18	27.50	28.56	40.92
2027	9.09	9.07	2.76	24.03	28.31	29.16	41.74
2028	9.09	9.07	2.76	24.87	29.05	29.88	42.77
2029	9.09	9.07	2.76	25.72	29.85	30.72	43.94
2030	9.09	9.07	2.76	26.84	30.87	31.44	44.96
2031	9.09	9.07	2.76	27.86	31.88	32.28	46.13
2032	9.09	9.07	2.76	29.10	33.10	33.36	47.64
2033	9.09	9.07	2.76	29.94	33.85	34.07	48.66
2034	9.09	9.07	2.76	29.94	33.85	34.07	48.66
2035	9.09	9.07	2.76	29.94	33.85	34.07	48.66
2036	9.09	9.07	2.76	29.94	33.85	34.07	48.66
2037	9.09	9.07	2.76	29.94	33.85	34.07	48.66

Table 27 Vehicle Operation Cost (VOC) for Case III (in ₹ per km)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2019	9.09	9.07	2.76	17.55	21.05	23.90	34.22
2020	9.09	9.07	2.76	17.55	21.05	23.90	34.22
2021	9.09	9.07	2.76	17.55	21.05	23.90	34.22
2022	9.09	9.07	2.76	17.55	21.05	23.90	34.22
2023	9.09	9.07	2.76	19.14	23.72	25.20	36.19
2024	9.09	9.07	2.76	19.52	23.99	25.57	36.67
2025	9.09	9.07	2.76	19.98	24.47	26.04	37.36
2026	9.09	9.07	2.76	20.37	25.00	26.28	37.70
2027	9.09	9.07	2.76	20.93	25.48	26.76	38.38
2028	9.09	9.07	2.76	21.49	26.01	27.24	39.07

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV
2029	9.09	9.07	2.76	22.16	26.55	27.84	39.89
2030	9.09	9.07	2.76	22.90	27.24	28.32	40.58
2031	9.09	9.07	2.76	23.64	27.83	28.92	41.40
2032	9.09	9.07	2.76	24.42	28.78	29.64	42.43
2033	9.09	9.07	2.76	25.33	29.53	30.24	43.25
2034	9.09	9.07	2.76	26.28	30.54	31.20	44.62
2035	9.09	9.07	2.76	27.41	31.40	32.04	45.79
2036	9.09	9.07	2.76	28.53	32.57	32.88	46.95
2037	9.09	9.07	2.76	29.77	33.64	33.96	48.46

It may be noted that the VOC data available in **Annex-D** are for the year 2019. The VOC values for the future years may be obtained based on the WPI which is published periodically by the Ministry of Commerce and Industry²⁰. Using the traffic data on estimated traffic volume given in **Table 16, 17** and **18**, the VOC for various alternative proposals can be worked out as under:

The VOC for small cars in the year 2019 for Case I and for 10 km road is:

- = 10.66 * 3131 * 365 * 10
- = ₹1218.24 Lakh

These are tabulated for all the three cases in Tables 28, 29 and 30.

Maintenance Cost

The net maintenance cost for each year after accounting for the tax element of 10% is indicated in **Table 31**. For instance, the maintenance cost for the existing road after construction of the bypass can be taken as $₹ 3,50,000 \times 0.90 \times 10 = ₹ 31.5$ lakh per year (without tax element). Similar analogy has been used for the calculation of tax element in the case of construction cost of bypass road and its routine maintenance cost as presented in **Table 31**.

Calculation of IRR: All the cost benefit data is tabulated as shown in **Table 31**. The Internal Rate of Return (IRR) can be calculated using the standard procedures like trial and error method. Both costs and benefits are discounted at different rates till both are balanced in trial and error method. The IRR obtained in this economic exercise works out to be 14.85%.

Table 28 Total Vehicle Operating Cost (in ₹ lakh) for the Existing Road under Do Nothing Scenario (Case I)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	Total VOC
2019	1218.24	622.41	489.15	535.95	1494.59	681.22	983.94	6025.50
2020	1327.96	678.56	533.16	601.99	1673.52	758.69	1094.99	6668.88

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	Total VOC
2021	1447.41	739.49	581.14	680.35	1873.24	841.04	1213.94	7376.61
2022	1577.76	805.99	633.41	767.46	2095.31	942.88	1359.50	8182.30
2023	1719.78	878.46	690.44	868.63	2347.65	1052.17	1517.39	9074.51
2024	1874.64	957.71	752.56	984.76	2645.24	1178.65	1698.13	10091.68
2025	2043.50	1043.72	820.34	1118.80	2977.47	1319.23	1899.28	11222.33
2026	2227.54	1137.70	894.22	1268.17	3370.51	1479.94	2130.95	12509.04
2027	2427.92	1240.04	974.67	1423.04	3757.17	1648.06	2373.09	13844.00
2028	2646.59	1351.54	1062.37	1551.15	4095.73	1796.43	2586.72	15090.53
2029	2884.71	1473.00	1157.98	1690.80	4464.82	1958.16	2819.60	16449.08
2030	3144.24	1605.60	1262.19	1843.15	4867.02	2134.60	3073.66	17930.44
2031	3427.10	1750.15	1375.79	2009.34	5304.84	2327.07	3350.81	19545.11
2032	3735.65	1907.85	1499.58	2190.54	5782.13	2536.92	3652.98	21305.64
2033	4071.83	2079.48	1634.56	2387.89	6302.68	2765.49	3982.09	23224.03
2034	4438.35	2266.64	1781.66	2602.56	6870.33	3014.10	4340.07	25313.72
2035	4837.95	2470.53	1941.99	2836.85	7488.89	3285.44	4730.78	27592.42
2036	5273.34	2692.73	2116.81	3091.91	8163.45	3580.83	5156.12	30075.20
2037	5748.03	2935.24	2307.35	3370.06	8897.83	3902.96	5619.96	32781.44

Table 29 Total Vehicle Operating Cost (in ₹ lakh) for Existing Road after Opening of Bypass Road (Case II)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	Total VOC
2019	1218.24	622.41	489.15	535.95	1494.59	681.22	983.94	6025.50
2020	1327.96	678.56	533.16	601.99	1673.52	758.69	1094.99	6668.88
2021	1447.41	739.49	581.14	680.35	1873.24	841.04	1213.94	7376.61
2022	1577.76	805.99	633.41	767.46	2095.31	942.88	1359.50	8182.30
2023	953.22	474.73	522.64	337.54	1074.14	513.13	489.28	4364.67
2024	1039.15	517.44	569.68	377.61	1200.12	569.22	542.41	4815.64
2025	1132.71	564.12	620.96	425.60	1338.20	633.76	603.43	5318.77
2026	1234.57	614.77	676.87	478.03	1495.59	705.73	672.11	5877.67
2027	1345.72	670.06	737.82	540.29	1678.10	785.48	748.04	6505.52
2028	1466.82	730.31	804.21	609.10	1876.78	876.86	835.19	7199.26

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	Total VOC
2029	1598.87	796.19	876.54	686.25	2101.69	982.24	935.02	7976.80
2030	1742.87	867.70	955.42	780.79	2369.57	1095.92	1042.06	8854.31
2031	1899.80	945.82	1041.45	883.68	2667.02	1226.53	1165.15	9829.45
2032	2070.67	1030.91	1135.14	1005.86	3017.96	1382.02	1311.10	10953.65
2033	2257.13	1123.60	1237.29	1127.78	3364.33	1538.28	1459.95	12108.36
2034	2460.19	1224.57	1348.61	1229.41	3667.04	1676.31	1591.38	13197.50
2035	2681.49	1334.81	1470.00	1339.79	3996.92	1826.78	1735.24	14385.03
2036	2922.69	1454.99	1602.27	1459.99	4356.46	1990.93	1891.54	15678.87
2037	3185.80	1586.08	1746.43	1591.13	4748.12	2170.00	2062.04	17089.61

Table 30 Total Vehicle Operating Cost (in ₹ lakh) for the Proposed Bypass (Case III)

Year	Small Cars	Big Cars	TW	Buses	LCV	HCV	MCV	Total VOC
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	564.60	281.13	101.28	335.82	896.17	354.12	762.84	3295.97
2024	615.33	306.62	110.37	373.84	987.28	392.17	843.63	3629.24
2025	670.80	333.94	120.34	417.14	1097.42	435.98	937.50	4013.12
2026	731.39	364.16	131.20	462.91	1222.57	479.03	1030.80	4422.06
2027	797.08	396.93	142.95	518.49	1358.57	531.83	1143.39	4889.25
2028	868.98	432.62	155.80	580.68	1512.15	590.59	1269.05	5409.87
2029	947.08	471.22	169.88	653.06	1683.19	658.37	1412.60	5995.39
2030	1032.12	513.83	185.17	735.55	1882.23	729.98	1567.37	6646.26
2031	1124.82	560.08	201.79	827.66	2096.19	812.80	1743.66	7366.99
2032	1226.28	610.70	219.97	932.42	2363.03	908.01	1948.88	8209.28
2033	1336.50	665.69	239.80	1054.63	2642.77	1010.16	2165.40	9114.94
2034	1456.93	725.77	261.41	1192.31	2979.62	1136.18	2434.64	10186.87
2035	1588.32	790.96	284.90	1355.83	3339.62	1272.26	2722.77	11354.66
2036	1731.39	861.97	310.61	1538.38	3776.60	1423.10	3042.46	12684.50
2037	1887.23	939.53	338.65	1749.87	4251.83	1602.11	3422.43	14191.65

Table 31 Statement of Cost and Benefit Analysis of Alternate Proposals

(in ₹ Lakh)

Year	Case I: Do Nothing		Case-II: Existing Road after opening of the Bypass		Case-III: Bypass Road		Cost Streams	Benefit Streams	Net Benefits
	Mainte- nance Cost*	Total VOC	Mainte- nance Cost*	Total VOC	Constru- ction*& Mainte- nance Cost *of Bypass	Total VOC of Bypass			
2019	31.5	6025.50	31.5	6025.50	990	0.00	-990	0.00	-990.00
2020	31.5	6668.88	31.5	6668.88	1980	0.00	-1980	0.00	-1980.00
2021	31.5	7376.61	31.5	7376.61	2970	0.00	-2970	0.00	-2970.00
2022	31.5	8182.30	31.5	8182.30	3960	0.00	-3960	0.00	-3960.00
2023	157.5	9074.51	157.5	4364.67	34.65	3295.97	-34.65	1413.87	1379.22
2024	31.5	10091.68	31.5	4815.64	34.65	3629.24	-34.65	1646.80	1612.15
2025	31.5	11222.33	31.5	5318.77	34.65	4013.12	-34.65	1890.44	1855.79
2026	31.5	12509.04	31.5	5877.67	34.65	4422.06	-34.65	2209.31	2174.66
2027	31.5	13844.00	31.5	6505.52	173.25	4889.25	-173.25	2449.24	2275.99
2028	157.5	15090.53	157.5	7199.26	34.65	5409.87	-34.65	2481.39	2446.74
2029	31.5	16449.08	31.5	7976.80	34.65	5995.39	-34.65	2476.89	2442.24
2030	31.5	17930.44	31.5	8854.31	34.65	6646.26	-34.65	2429.87	2395.22
2031	31.5	19545.11	31.5	9829.45	34.65	7366.99	-34.65	2348.67	2314.02
2032	31.5	21305.64	31.5	10953.65	34.65	8209.28	-34.65	2142.72	2108.07
2033	157.5	23224.03	157.5	12108.36	34.65	9114.94	-34.65	2000.72	1966.07
2034	31.5	25313.72	31.5	13197.50	173.25	10186.87	-173.25	1929.35	1756.10
2035	31.5	27592.42	31.5	14385.03	34.65	11354.66	-34.65	1852.73	1818.08
2036	31.5	30075.20	31.5	15678.87	34.65	12684.50	-34.65	1711.82	1677.17
2037	31.5	32781.44	31.5	17089.61	173.25	14191.65	-173.25	1500.18	1326.93
								IRR=	14.85%

^{*} Financial Price has been converted in to Economic Price by excluding the Tax Components

8. STAGES INVOLVED IN ECONOMIC EVALUATION

- **8.1** The process of economic evaluation involves a number of stages. The normal stages involved in their sequential order are as follows^{9,19}:
- (1) Identification and Definition of the Project
- (2) Collection of economic base data
- (3) Traffic surveys on existing facility
- (4) Selection of policy variables for analysis and decision criteria
- (5) Inventory of existing road
- (6) Traffic projections
- (7) Engineering design of proposed alternative schemes
- (8) Estimation of cost of new facility as per all alternatives considered
- (9) Traffic analysis on existing and new/proposed roads
- (10) Estimation of Road User Benefits
- (11) Economic Analysis

8.2 Identification and Definition of the Project

The first step in the process is to clearly identify the project and define its scope. This will help in establishing important factors such as its length, cost, traffic etc.

8.3 Collection of Economic Base Data

In order to carry out the economic analysis of the project, a good amount of economic data is needed. This data will be especially useful in establishing traffic growth rates and forecasting future traffic. Data on past trends of growth of national income i.e. Gross National Product (GNP), population, motor vehicle population, sale of petroleum products, agricultural production, industrial production, etc. can be particularly valuable.

8.4 Traffic Surveys

Traffic surveys of the following nature are needed:

- (1) Traffic census data at intervals of say 20 km, on the existing road, giving Average Daily Traffic (ADT) with composition.
- (2) Past census data to establish traffic growth rates in the past.
- (3) Origin Destination (O-D) surveys in case of a bypass
- (4) Speed and delay studies on the existing alignment

8.5 Selection of Policy Variables for Analysis and Decision Criteria

The most important policy variable that has to be selected is the design life. It is normal to have highway economic analysis for a design life of 15-20 years. Any value above this range is not likely to influence the analysis because of the effect of discounting. Also, forecasts beyond this range are likely to be erroneous. Thus, for the present, the analysis in India may be done for 15-20 years. If a lesser period is selected, some salvage value will have to be assigned to the

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facility at the last year of the design period. This may vary from 10 to 20 percent of the initial cost of the facility.

The next point to be selected is the discount rate or the minimum IRR that will be considered acceptable. This factor has been discussed earlier and for Indian conditions, a discount rate of 12 percent per annum is generally acceptable. There are many issues, which need to be addressed regarding shadow pricing of wages, materials and equipment. It is good to arrive at a decision on these points right in the beginning.

8.6 Inventory of the Existing Road

The existing road should be fully surveyed and mapped along with the particulars such as terrain, traffic, road conditions (geometry, roughness pavement width) and pavement characteristics (strength, composition, thickness, deflection, etc.) should also be collected. These will have an influence on the design and specification that will be selected and also on the cost of the alternatives.

8.7 Traffic Projections

Since traffic affects pavement design, design of pavement width and road user costs, its accurate forecast is necessary. This can be done by various methods such as:

- (i) Time Series analysis of past traffic count data at the site
- (ii) Time Series analysis of past growth of motor vehicle population in the region
- (iii) Time Series analysis of past growth of sale of petroleum products in the region
- (iv) Correlation between growth of traffic and growth of selected economic indicators.

On the National Highways, the rate of growth is likely to be in the range of 8-12 percent in the coming years.

8.8 Engineering Design of Alternatives

Based on the present condition of the road and present traffic, the future traffic is estimated and various alternatives are visualized to meet the demand. The alternatives might consist of stage-construction strategies or full construction initially.

8.9 Estimation of Cost of New Facility for all Alternatives

For each of the selected alternatives, cost estimates are worked out based on engineering designs. Taxes and subsidies are deducted and shadow pricing is done to arrive at economic costs. The cost of maintenance is also estimated for each of the future years. It has been roughly found that the cost of a road project exclusive of taxes can be taken as 85 - 90 % of the total cost.

8.10 Traffic Analysis

The analysis of speed-flow is carried out for each year of the design period, knowing the traffic on the road each year. The analysis is carried out for both the existing road and each of the envisaged alternatives. The design should consider widening the pavement to the next stage when the traffic exceeds the design service volume, which may be taken from IRC:64¹¹. If such

widening is not carried out the effect of congestion, described in Section 6.9 should be added with VOC.

8.11 Estimation of Road User Benefits

Knowing the traffic volume of each class of vehicle, the corresponding speeds, roughness values, pavement widths and geometry (rise and fall and/or curvature), the VOC components can be calculated from the VOC Tables. They are then tabulated including and excluding passenger time savings for each year of analysis.

8.12 Economic Analysis

The economic analysis is then done for each alternative by comparing with the "do-nothing alternative" and also for the incremental investments from one alternative to the other. If the results are acceptable, as per decision criteria already established, the best alternative is selected. There are ready-made packages for carrying out Economic Analysis. World Bank's HDM IV (Version 2.0) is one such software.

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TABLE A.1 SPEED-FLOW (SF) EQUATIONS FOR DIFFERENT VEHICLES AND CARRIAGEWAYS

Road Type	Plain Terrain	Rolling Terrain	Hilly Terrain
	SF1: V _c = 68.54 - 0.0562*Q	SF7: V _c = 64.88 - 0.0562*Q	SF13: V _c = 55.104 - 0.0562*Q
	SF2: V _{BUS} = 57.953 - 0.0478*Q	SF8: V _{BUS} = 54.971 - 0.0478*Q	SF14: V _{BUS} = 46.609 - 0.0478*Q
	SF3: V _{LCV} = 51.937 - 0.0510*Q	SF9: V _{LCV} = 47.598 - 0.051*Q	SF15: V _{LCV} = 37.169 - 0.0510*Q
Single Lane	SF4: V _{HCV} = 50.12 - 0.0373*Q	SF10: V _{HCV} = 45.747 - 0.037*Q	SF16: V _{HCV} = 35.047 - 0.0373*Q
	SF5: V _{MCV} = 39.718 - 0.0313*Q	SF11: $V_{MCV} = 36.253 - 0.031*Q$	SF17: V _{MCV} = 27.773 - 0.0313*Q
	SF6: V _{TW} = 55.466 - 0.0300*Q	SF12: V _{TW} = 53.837 - 0.03*Q	SF18: V _{TW} = 49.057 - 0.0300*Q
	SF19: V _c = 70.206 - 0.0210*Q	SF25: V _c = 71.201 - 0.0210*Q	SF31: V _c = 57.537 - 0.0210*Q
	SF20: V _{BUS} = 62.969 - 0.0130*Q	SF26: V _{BUS} = 58.545 - 0.0130*Q	SF32: V _{BUS} = 47.955 - 0.0130*Q
Intermediate	SF21: V _{LCV} = 56.282 - 0.0195*Q	SF27: V _{LCV} = 51.878 - 0.0195*Q	SF33: V _{LCV} = 41.293 - 0.0195*Q
Earthen Shoulders	SF22: V _{HCV} = 55.491 - 0.0186*Q	SF28: V _{HCV} = 51.061 - 0.0186*Q	SF34: V _{HCV} = 40.221 - 0.0186*Q
	SF23: V _{MCV} = 43.974 - 0.0156*Q	SF29: V _{MCV} = 40.464 - 0.0156*Q	SF35: V _{MCV} = 31.873 - 0.0156*Q
	SF24: V _{TW} = 62.204 - 0.0109*Q	SF30: V _{TW} = 60.52 - 0.0109*Q	SF36: V _{TW} = 55.578 - 0.0109*Q
	SF37: V _c = 94.55 - 0.0170*Q	SF43: V _c = 91.789 - 0.0175*Q	SF49: V _c = 80.726 - 0.0175*Q
	SF38: V _{BUS} = 75.552 - 0.0079*Q	SF44: V _{BUS} = 70.57 - 0.0136*Q	SF50: V _{BUS} = 59.175 - 0.0136*Q
Two Lane	SF39: V _{LCV} = 67.4 - 0.0060*Q	SF45: V _{LCV} = 64.953 - 0.0137*Q	SF51: V _{LCV} = 52.948 - 0.0137*Q
with Earthen Shoulders	SF40: V _{HCV} = 62.853 - 0.0083*Q	SF46: V _{HCV} = 60.356 - 0.012*Q	SF52: V _{HCV} = 48.959 - 0.0120*Q
	SF41: V _{MCV} = 49.808 - 0.0070*Q	SF47: V _{MCV} = 47.83 - 0.0101*Q	SF53: V _{MCV} = 38.798 - 0.0101*Q
	SF42: V _{TW} = 71.724 - 0.0105*Q	SF48: V _{TW} = 64.849 - 0.0105*Q	SF54: V _{TW} = 60.096 - 0.0105*Q

Road Type	Plain Terrain	Rolling Terrain	Hilly Terrain
	SF55: V _c = 97.844 - 0.0079*Q	SF61: V _C = 94.087 - 0.0079*Q	SF67: V _c = 84.03 - 0.0079*Q
	SF56: V _{BUS} = 78.53 - 0.0071*Q	SF62: V _{BUS} = 75.406 - 0.0071*Q	SF68: V _{BUS} = 66.648 - 0.0071*Q
Two Lane	SF57: V _{LCV} = 70.118 - 0.0071*Q	SF63: V _{LCV} = 67.193 - 0.0071*Q	SF69: V _{LCV} = 58.623 - 0.0071*Q
with Paved Shoulders	SF58: V _{HCV} = 65.329 - 0.0062*Q	SF64: V _{HCV} = 62.56 - 0.0062*Q	SF70: V _{HCV} = 54.296 - 0.0062*Q
	SF59: V _{MCV} = 51.77 - 0.0052*Q	SF65: V _{MCV} = 49.576 - 0.0052*Q	SF71: V _{MCV} = 43.027 - 0.0052*Q
	SF60: V _{TW} = 71.816 - 0.0073*Q	SF66: V _{TW} = 70.452 - 0.0073*Q	SF72:V _{TW} = 66.043 - 0.0073*Q
	SF73: V _C = 94.505 - 0.0091*Q	SF79: V _C = 91.783 - 0.0091*Q	SF85: V _C = 80.412 - 0.0091*Q
	SF74: V _{BUS} = 79.389 - 0.0069*Q	SF80:V _{BUS} = 74.478 - 0.0069*Q	SF86: V _{BUS} = 62.72 - 0.0069*Q
Four Lane	SF75: V _{LCV} = 70.744 - 0.0080*Q	SF81:V _{LCV} = 65.693 - 0.008*Q	SF87: V _{LCV} = 53.551 - 0.0080*Q
with Earthen Shoulders	SF76: V _{HCV} = 66.156 - 0.0111*Q	SF82:V _{HCV} = 61.416 - 0.0111*Q	SF88: V _{HCV} = 49.819 - 0.0111*Q
	SF77: V _{MCV} = 52.425 - 0.0093*Q	SF83:V _{MCV} = 48.67 - 0.0093*Q	SF89: V _{MCV} = 39.479 - 0.0093*Q
	SF78: V _{TW} = 76.278 - 0.0075*Q	SF84:V _{TW} = 74.456 - 0.0075*Q	SF90: V _{TW} = 69.109 - 0.0075*Q
	SF91: V _{cs} = 47.473 + (2253.686-0.408*Q) ^{0.5}	SF98:V _{cs} = 45.65 + (2083.923-0.392*Q) ^{0.5}	SF105: $V_{cs} = 40.771 + (1662.274 - 0.35 * Q)^{0.5}$
	SF92: V _{CB} = 48.238 + (2326.905-0.24*Q) ^{0.5}	SF99:V _{CB} = 45.469 + (2067.43-0.226*Q) ^{0.5}	SF106: V _{CB} = 38.839 + (1508.468-0.193*Q) ^{0.5}
	SF93: V _{BUS} = 37.550 + (1410.003-0.253*Q) ^{0.5}	SF100:V _{BUS} = 35.041 + (1227.872-0.236*Q) ^{0.5}	SF107: $V_{BUS} = 29.009 + (841.522-0.195*Q)^{0.5}$
Four Lane with Paved Shoulders	SF94: V _{LCV} = 30.953 + (958.088-0.154*Q) ^{0.5}	SF101:V _{LCV} = 28.871 + (833.535-0.144*Q) ^{0.5}	SF108: V _{LCV} = 23.778 + (565.393-0.118*Q) ^{0.5}
	SF95: V _{HCV} = 34.601 + (1197.229-0.203*Q) ^{0.5}	SF102:V _{HCV} = 32.274 + (1041.611-0.189*Q) ^{0.5}	SF109: V _{HCV} = 26.581 + (706.55-0.156*Q) ^{0.5}
	SF96: V _{MCV} = 30.669 + (940.588-0.147*Q) ^{0.5}	SF103:V _{MCV} = 29.965 + (897.901-0.144*Q) ^{0.5}	SF110: V _{MCV} = 27.896 + (778.187-0.134*Q) ^{0.5}
	SF97: V _{TW} = 37.978 + (1442.328-0.262*Q) ^{0.5}	SF104:V _{TW} = 37.106 + (1376.855-0.256*Q) ^{0.5}	SF111: V _{TW} = 34.545 + (1193.357-0.238*Q) ^{0.5}

Road Type	Plain Terrain	Rolling Terrain	Hilly Terrain
	SF113:V _{CB} = 48.278 + (2330.765-0.313*Q) ^{0.5}	SF120:V _{CB} = 45.507 + (2070.887-0.295*Q) ^{0.5}	SF127: V _{CB} = 38.871 + (1510.955-0.252*Q) ^{0.5}
	SF114: $V_{BUS} = 37.155 + (1380.494-0.16*Q)^{0.5}$	SF121:V _{BUS} = 34.672 + (1202.148-0.149*Q) ^{0.5}	SF128: V _{BUS} = 28.704 + (823.92-0.124*Q) ^{0.5}
Six Lane Divided	SF115: $V_{LCV} = 31.030 + (962.861-0.104*Q)^{0.5}$	SF122:V _{LCV} = 28.943 + (837.697-0.097*Q) ^{0.5}	SF129: V _{LCV} = 23.837 + (568.203-0.08*Q) ^{0.5}
Carriageway	SF116: V _{HCV} = 34.287 + (1175.598-0.133*Q) ^{0.5}	SF123:V _{HCV} = 31.981 + (1022.784-0.124*Q) ^{0.5}	SF130: V _{HCV} = 26.339 + (693.743-0.102*Q) ^{0.5}
	SF117: V _{MCV} = 30.427 + (925.802-0.094*Q) ^{0.5}	SF124:V _{MCV} = 29.728 + (883.754-0.092*Q) ^{0.5}	SF131: V _{MCV} = 27.676 + (765.961-0.086*Q) ^{0.5}
	SF118: V _{TW} = 36.171 + (1308.341-0.212*Q) ^{0.5}	SF125:V _{TW} = 35.34 + (1248.916-0.207*Q) ^{0.5}	SF132: V _{TW} = 32.901 + (1082.476-0.193*Q) ^{0.5}
	SF133: V _{cs} = 47.457 + (2252.167-0.289*Q) ^{0.5}	SF140:V _{cs} = 45.635 + (2082.553-0.278*Q) ^{0.5}	
	SF134: V _{CB} = 48.296 + (2332.504-0.317*Q) ^{0.5}	SF141:V _{CB} = 45.524 + (2072.435-0.299*Q) ^{0.5}	
	SF135: V _{BUS} = 37.150 + (1380.123-0.163*Q) ^{0.5}	SF142:V _{BUS} = 34.668 + (1201.87-0.152*Q) ^{0.5}	
Eight Lane Divided Carriageway	SF136: V _{LCV} = 30.879 + (953.513-0.104*Q) ^{0.5}	SF143: V _{LCV} = 28.802 + (829.555-0.097*Q) ^{0.5}	
Carriageway	SF137: V _{HCV} = 34.240 + (1172.378-0.134*Q) ^{0.5}	SF144: V _{HCV} = 31.938 + (1020.036-0.125*Q) ^{0.5}	
	SF138: V _{MCV} = 30.382 + (923.066-0.095*Q) ^{0.5}	SF145: V _{MAV} = 29.684 + (881.14-0.093*Q) ^{0.5}	
	SF139: V _{TW} = 36.300 + (1317.69-0.226*Q) ^{0.5}	SF146: V _{TW} = 35.466 + (1257.837-0.221*Q) ^{0.5}	
	SF147: V _{cs} = 47.457 + (2252.167-0.289*Q) ^{0.5}		
-	SF148: V _{CB} = 48.296 + (2332.504-0.317*Q) ^{0.5}		
	SF149: V _{BUS} = 37.150 + (1380.123-0.163*Q) ^{0.5}		
Expressways	SF150: V _{LCV} = 30.879 + (953.513-0.104*Q) ^{0.5}		
,	SF151: V _{HCV} = 34.240 + (1172.378-0.134*Q) ^{0.5}		
	SF152: V _{MCV} = 30.382 + (923.066-0.095*Q) ^{0.5}		
	SF153: V _{TW} = 36.300 + (1317.69-0.226*Q) ^{0.5}		

Where,

Q = Volume of traffic in PCU/hour V_c = Speed of Cars in km/hour

 V_{CS} = Speed of Small Cars in km/hour V_{CB} = Speed of Big Cars in km/hour V_{BUS} = Speed of Buses in km/hour

 V_{LCV} = Speed of Light Commercial Vehicles in km/hour

 V_{HCV} = Speed of Two Axle Heavy Commercial Vehicles in km/hour V_{MAV} = Speed of Multi Axle Heavy Commercial Vehicles in km/hour

 V_{TW} = Speed of Two Wheelers in km/hour

VOC EQUATIONS FOR INDIVIDUAL COMPONENTS OF VOC

Table B.1 VOC and Time Cost Equations for Small Cars

S. No.	VOC Component	Equation
1	Fuel Consumption* (FC) *Composition of 70:30 for Petrol and Diesel may be considered to workout fuel cost of Small Cars unless otherwise enumerated	Petrol Cars: $FC_{CS} = 30+(844.085/V)+ 0.003 V^2 + 0.001*$ RG + 0.3414* RS - 0.2225*FL Diesel Cars: $FC_{CB} = 35+(983.503/V)+ 0.003 V^2 + 0.002*$ RG + 0.339* RS - 0.4785*FL
2	Spare Parts Cost (SP) (a) Excluding Taxes (b) Including Taxes	$\frac{SP_{ET}}{NP_{ET}} = 0.0075 * (RG - 2000) * 10^{-5}$ $\frac{SP_{IT}}{NP_{IT}} = 0.0075 * (RG - 2000) * 10^{-5}$
3	Maintenance Labour (LC)	LC = 1.79934 * SP
4	Tyre Life (TL)	TL = 68771-147.9* RF -26.72*(RG/W)
5	Engine Oil (EOL)	EOL = 1.8807+0.036615*RF+0.000578*(RG/W)
6	Other Oil (OL)	OL = 1.631+0.05167*RF+0.001867*(RG/W)
7	Grease (G)	G = 2.816+0.2007*RF
8	Speed (V) (a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway	$\begin{split} & V_{CS}^{SL} = 66.44\text{-}0.6922^*RF\text{-}0.002874^*(RG\text{-}2000) \\ & V_{CS}^{IL} = 73.16\text{-}0.7298^*RF\text{-}0.002231^*(RG\text{-}2000) \\ & V_{CS}^{2L} = 81.19\text{-}0.7892^*RF\text{-}0.001891^*(RG\text{-}2000) \\ & V_{CS}^{4L} = 100.625\text{-}0.394^*RF\text{-}0.00330^*RG \\ & V_{CS}^{6L} = 101.065\text{-}0.386^*RF\text{-}0.00323^*RG \\ & V_{CS}^{8L} = 103.517\text{-}0.386^*RF\text{-}0.00323^*RG \\ & V_{CS}^{EW} = 93.71\text{-}0.386^*RF\text{-}0.00323^*RG + 0.701^*W_{D} \\ & Where \ W_{D} \ \textit{is Width of Carriageway in one direction (in m) \end{split}$
9	Utilisation (UPD)	UPD = $6.7127 * V_{cs}^{j}$ Where $j = SL, IL, 2L, 4L, 6L, 8L, EW$
10	Fixed Cost (FXC) (a) Excluding Taxes (b) Including Taxes	$FXC_{ET} = \frac{395.65}{UPD}$ $FXC_{IT} = \frac{400.61}{UPD}$
11	Depreciation Cost (DC)	
	(a) Excluding Taxes	$DC_{ET} = \frac{42.83}{UPD}$
	(b) Including Taxes	$DC_{IT} = \frac{76.68}{UPD}$

S. No.	VOC Component	Equation
12	Passenger Time Cost (PT)	
	(a) Single Lane and Intermediate Lane	$PT_{CS}^{SL_IL} = \frac{244.07}{V}$
	(b) Two Lane	$PT_{CS}^{2L} = \frac{328.06}{V}$
	(c) Multi-Lane (Four, Six and Eight Lane)	$PT_{CS}^{ML} = \frac{498.65}{V}$
	(d) Expressways	$PT_{CS}^{EW} = \frac{721.73}{V}$

Table B.2 VOC and Time Cost Equations for Big Cars

S. No.	VOC Component	Equation
1	Fuel Consumption* (FC) *Composition of 30:70 for Petrol and Diesel may be considered to workout fuel cost of Big Cars	Petrol Cars: FC _{CS} = 30+(844.085/V)+ 0.003 V ² + 0.001* RG + 0.3414* RS - 0.2225*FL Diesel Cars: FC _{CB} = 35+(983.503/V)+ 0.003 V ² + 0.002* RG + 0.339* RS - 0.4785*FL
2	Spare Parts Cost (SP) (a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = 0.0045 * (RG - 2000) * 10^{-5}$ $\frac{SP_{IT}}{NP_{IT}} = 0.0045 * (RG - 2000) * 10^{-5}$
3	(b) Including Taxes Maintenance Labour (LC)	$\frac{1}{NP_{IT}} = 0.0045 * (RG - 2000) * 10$ LC = 1.79934 * SP
4	Tyre Life (TL)	TL = 68771-147.9* RF -26.72*(RG/W)
5	Engine Oil (EOL)	EOL = 1.8807+0.036615*RF+0.000578*(RG/W)
6	Other Oil (OL)	OL = 1.631+0.05167*RF+0.001867*(RG/W)
7	Grease (G)	G = 2.816+0.2007*RF
8	Speed (V) (a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway	$\begin{split} & V_{CB}^{SL} = 67.04\text{-}0.6984^*RF\text{-}0.002956^*(RG\text{-}2000) \\ & V_{CB}^{IL} = 73.82\text{-}0.7364^*RF\text{-}0.002251^*(RG\text{-}2000) \\ & V_{CB}^{2L} = 81.92\text{-}0.7963^*RF\text{-}0.001915^*(RG\text{-}2000) \\ & V_{CB}^{4L} = 100.625\text{-}0.394^*RF\text{-}0.00330^*RG \\ & V_{CB}^{6L} = 104.159\text{-}0.398^*RF\text{-}0.00333^*RG \\ & V_{CB}^{8L} = 107.743\text{-}0.402^*RF\text{-}0.00337^*RG \\ & V_{CB}^{EW} = 97.53\text{-}0.402^*RF\text{-}0.00337^*RG + 0.729^*W_D \\ & Where \ W_D \ \textit{is Width of Carriageway in one direction (in m)} \end{split}$
9	Utilisation (UPD)	UPD = 6.7378 * V _{CB} ; Where j = SL, IL, 2L, 4L, 6L, 8L, EW
10	Fixed Cost (FXC)	
	(a) Excluding Taxes	$FXC_{ET} = \frac{395.65}{UPD}$

S. No.	VOC Component	Equation
	(b) Including Taxes	$FXC_{IT} = \frac{400.61}{UPD}$
11	Depreciation Cost (DC)	
	(a) Excluding Taxes	$DC_{ET} = \frac{42.83}{UPD}$
	(b) Including Taxes	$DC_{IT} = \frac{76.68}{UPD}$
12	Passenger Time Cost (PT)	
	(a) Single Lane and Intermediate Lane	$PT_{CB}^{SL_IL} = \frac{244.07}{V}$
	(b) Two Lane	$PT_{CB}^{2L} = \frac{328.06}{V}$
	(c) Multi-Lane (Four, Six and Eight Lane)	$PT_{CB}^{ML} = \frac{721.73}{V}$
	(d) Expressways	$PT_{CB}^{EW} = \frac{721.73}{V}$

Table B.3 VOC and Time Cost Equations for Two Wheelers

S. No.	VOC Component	Equation
1	Fuel Consumption (FC)	FC = 2.704+(439.656/V)+0.00349*V ² + 0.000157*RG + 0.3642*RS - 0.2709*FL
2	Spare Parts Cost (SP)	
	(a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = (-55.879 + 0.024 * RG) * 10^{-5}$
	(b) Including Taxes	$\frac{\text{SP}_{\text{IT}}}{\text{NP}_{\text{IT}}} = (-55.879 + 0.024 * \text{RG}) * 10^{-5}$
3	Maintenance Labour (LC)	LC = 0.5498*SP
4	Tyre Life (TL)	TL = 47340 - 101.8*RF - 18.39* RG/W
5	Engine Oil (EOL)	EOL= 0.405+0.007899* RF +0.000125*(RG/W)
6	Speed (V)	
	 (a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway 	$\begin{split} & V_{TW}^{SL} = 52.91\text{-}0.6922 \text{*RF-}0.002874 \text{*}(RG-2000) \\ & V_{TW}^{IL} = 58.86\text{-}0.7298 \text{*RF-}0.002231 \text{*}(RG-2000) \\ & V_{TW}^{2L} = 59.71\text{-}0.7892 \text{*RF-}0.001891 \text{*}(RG-2000) \\ & V_{TW}^{4L} = 78.57\text{-}0.7235 \text{*RF-}0.001729 \text{*}RG \\ & V_{TW}^{6L} = 81.35\text{-}0.7235 \text{*}RF-0.001729 \text{*}RG \\ & V_{TW}^{8L} = 82.73\text{-}0.7235 \text{*}RF-0.001729 \text{*}RG \\ & V_{TW}^{EW} = 77.19\text{-}0.7235 \text{*}RF-0.001729 \text{*}RG \\ & V_{TW}^{EW} = 32.73 \text{-}0.7235 \text{*}RF-0.001729 \text{*}RG \\ & V_{TW}^{EW} = 77.19\text{-}0.7235 \text{*}RF-0.001729 \text{*}RG \\ & V_{TW}^{EW} = 32.73 \text{-}0.7235 \text{-}RF-0.001729 \text{-}RG \\ & V_{TW}^{EW} = 32.73 \text{-}0.7235 \text{-}RG \\ & V_{TW}^{EW} = 32$
7	Utilisation (UPD)	UPD = 2.119* $V_{TW}j$ Where $j = SL$, IL , $2L$, $4L$, $6L$, $8L$, EW

S. No.	VOC Component	Equation
8	Fixed Cost (FXC)	
	(a) Excluding Taxes	$FXC_{ET} = \frac{24.32}{UPD}$
	(b) Including Taxes	$FXC_{IT} = \frac{24.86}{UPD}$
9	Depreciation Cost (DC)	
	(a) Excluding Taxes	$DC_{ET} = \frac{4.26}{UPD}$
	(b) Including Taxes	$DC_{IT} = \frac{5.85}{UPD}$
10	Passenger Time Cost (PT)	
	(a) Single Lane and Intermediate Lane	$PT_{TW}^{SL_IL} = \frac{49.28}{V}$
	(b) Two Lane	$PT_{TW}^{2L} = \frac{70.29}{V}$
	(c) Multi-Lane Roads	$PT_{TW}^{ML} = \frac{70.77}{V}$
	(d) Expressways	$PT_{TW}^{EW} = \frac{70.77}{V}$

Table B.4 VOC and Time Cost Equations for Buses

S. No.	VOC Component	Equation
1	Fuel Consumption (FC)	FC = 34.23 + (4054.42/V) + 0.02149 * V ² + 0.001246 * RG
		+ 3.4557 * RS - 1.8454 * FL
2	Spare Parts Cost (SP)	
	(a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = e^{(-9.7871 + 0.007373*RF + 0.0000723*RG + 1.925/W)}$
	(b) Including Taxes	$\frac{\text{SP}_{\text{IT}}}{\text{NP}_{\text{IT}}} = e^{(-10.1126 + 0.007373*\text{RF} + 0.0000723*\text{RG} + 1.925/\text{W})}$
3	Maintenance Labour (LC)	LC = 1.1781*SP
4	Tyre Life (TL)	TL = 38519-389.52*RF-1.32*RG+983.829*W

S. No.	VOC Component	Equation					
5	Engine Oil (EOL)	EOL = 0.4303+0.001494*RF+0.0007885*(RG/W)					
6	Other Oil (OL)	OL = 3.3201+0.002889*RF + 0.0008217*RG-0.3295*W					
7	Grease (G)	G = 4.992+0.03376*RF+ 0.3634*W					
8	Speed (V) (a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway	$\begin{array}{c} {\rm V_{BUS}}^{\rm SL} \!$					
9	Utilisation (UPD)	UPD=22.7134 + 12.2569 * V _{BUS} j Where j = SL, IL, 2L, 4L, 6L, 8L, EW					
10	Fixed Cost (FXC) (a) Excluding Taxes	$FXC_{ET} = \frac{772.89}{UPD}$					
	(b) Including Taxes	$FXC_{IT} = \frac{1415.09}{UPD}$					
11	Depreciation Cost (DC)						
	(a) Excluding Taxes	$DC_{ET} = \frac{221.00}{UPD}$					
	(b) Including Taxes	$DC_{IT} = \frac{355.71}{UPD}$					
12	Crew Cost (CW)	$CW = \frac{3775.3}{UPD}$					
13	Passenger Time Cost (PT)						
	(a) Single Lane and Intermediate Lane	$PT_{BUS}^{SL_IL} = \frac{7297.63}{UPD}$					
	(b) Two Lane	$PT_{BUS}^{2L} = \frac{15509.80}{UPD}$					
	(c) Multi-Lane Roads	$PT_{BUS}^{ML} = \frac{23721.98}{UPD}$					
	(d) Expressways	$PT_{BUS}^{EW} = \frac{28385.28}{UPD}$					

Table B.5 VOC and Commodity Holding Cost Equations for Light Commercial Vehicles (LCVs)

S. No.	VOC Component	Equation						
1	Fuel Consumption (FC)	FC = 22.504+1708.244/V+0.02591*(V) ² + 0.001612*RG +5.6863*RS-0.8744*FL						
2	Spare Parts Cost (SP)							
	(a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = e^{(-10.5615 + 0.000141 * RG + 3.493/W)}$						
	(a) Including Taxes	$\frac{SP_{IT}}{NP_{IT}} = e^{(-10.5615 + 0.000141 * RG + 3.493/W)}$						
3	Maintenance Labour (LC)	LC = 0.85773 * SP(IT)						
4	Tyre Life (TL)	TL = 22382+3817*W-375.3*RF-1.037*RG						
5	Engine Oil (EOL)	EOL = 0.80679+0.019496*RF+0.0001297*(RG/W)						
6	Other Oil (OL)	OL = 2.0415+0.0001058*RG						
7	Grease (G)	G = 0.3661+0.0283*RF+0.000251*RG						
8	Speed (V)							
	 (a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway 	$\begin{split} & V_{\text{LCV}}^{ \text{SL}} = 49.87 \text{-} 0.4447 \text{*RF-} 0.00088 \text{*} (\text{RG-}2000) \\ & V_{\text{LCV}}^{ \text{IL}} = 53.70 \text{-} 0.4788 \text{*RF-} 0.00095 \text{*} (\text{RG-}2000) \\ & V_{\text{LCV}}^{ \text{2L}} = 57.41 \text{-} 0.5119 \text{*RF-} 0.00102 \text{*} (\text{RG-}2000) \\ & V_{\text{LCV}}^{ \text{4L}} = 74.897 \text{-} 0.163 \text{*RF-} 0.0031 \text{*RG} \\ & V_{\text{LCV}}^{ \text{6L}} = 77.036 \text{-} 0.163 \text{*RF-} 0.0031 \text{*RG} \\ & V_{\text{LCV}}^{ \text{8L}} = 79.174 \text{-} 0.163 \text{*RF-} 0.0031 \text{*RG} \\ & V_{\text{LCV}}^{ \text{EW}} = 70.620 \text{-} 0.163 \text{*RF-} 0.0031 \text{*RG} + 0.611 \text{*W}_{\text{D}} \\ & Where \ \text{W}_{\text{D}} \ \textit{is Width of Carriageway in one direction (in m)} \end{split}$						
9	Utilisation (UPD)	UPD = $28.807 + 2.1836*V_{LCV}^{j}$ Where $j = SL$, IL , $2L$, $4L$, $6L$, $8L$, EW						
10	Fixed Cost (FXC)							
	(a) Excluding Taxes	$FXC_{ET} = \frac{723.80}{UPD}$						
	(b) Including Taxes	$FXC_{IT} = \frac{829.56}{UPD}$						
11	Depreciation Cost (DC)							
	(a) Excluding Taxes	$DC_{ET} = \frac{120.90}{UPD}$						
	(b) Including Taxes	$DC_{IT} = \frac{173.51}{UPD}$						
12	Crew Cost (CW)	$CW = \frac{900}{UPD}$						

S. No.	VOC Component	Equation
13	Commodity Holding Cost (CHC)	
	(a) Single Lane and Intermediate Lane	$CHC_{LCV}^{SL_IL} = \frac{64.71}{UPD}$
	(b) Two Lane	$CHC_{LCV}^{2L} = \frac{71.35}{UPD}$
	(c) Multi-Lane Roads	$CHC_{LCV}^{ML} = \frac{149.12}{UPD}$
	(d) Expressways	$CHC_{LCV}^{EW} = \frac{149.12}{UPD}$

Table B.6 VOC and Commodity Holding Cost Equations for Two Axle Heavy Commercial Vehicles (HCVs)

S. No.	VOC Component	Equation					
1	Fuel Consumption (FC)	FC = 50.0 + 8049.955/V + 0.012 * V ² + 0.005 * RG +					
		4.565 *RS - 4.904 *FL - 7.285 * (PWR)					
2	Spare Parts Cost (SP)						
	(a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = e^{(-9.492638 + 0.0001413 * RG + 3.493/W)}$					
	(b) Including Taxes	$\frac{SP_{lT}}{NP_{lT}} = e^{(-9.492638 + 0.0001413 * RG + 3.493/W)}$					
3	Maintenance Labour (LC)	LC = 0.7912*SP					
4	Tyre Life (TL)	TL = 24662+4205*W-413.6*RF-1.142*RG					
5	Engine Oil (EOL)	EOL = 1.0277+0.02495*RF+0.0001782*(RG/W)					
6	Other Oil (OL)	OL = 5.1037+0.0002646*RG					
7	Grease (G)	G = 0.9153+0.0707*RF+0.000627*RG					
8	Speed (V)						
	(a) Single Lane	V _{HCV} ^{SL} =48.29-0.4306*RF-0.00086*(RG-2000)					
	(b) Intermediate Lane	V _{HCV} ^{IL} = 53.12-0.4736*RF-0.00094*(RG-2000)					
	(c) Two Lane	V _{HCV} ^{2L} =56.52-0.5040*RF-0.00100*(RG-2000)					
	(d) Four Lane	V _{HCV} ^{4L} =75.15-0.6487*RF-0.001285*RG					
	(e) Six Lane	V _{HCV} ^{6L} =77.17-0.6487*RF-0.001285*RG					
	(f) Eight Lane	V _{HCV} ^{8L} =79.19-0.6487*RF-0.001285*RG					
	(g) Expressway	V _{HCV} ^{EW} =71.11-0.6487*RF-0.001285*RG+0.577*W _D					
		$Where W_D$ is Width of Carriageway in one direction (in m)					
9	Utilisation (UPD)	UPD = 55.6719+4.22*V _{HCV}					
		Where $j = SL$, IL , $2L$, $4L$, $6L$, $8L$, EW					

S. No.	VOC Component	Equation
10	Fixed Cost (FXC)	
	(a) Excluding Taxes	$FXC_{ET} = \frac{924.28}{UPD}$
	(b) Including Taxes	$FXC_{IT} = \frac{1056.82}{UPD}$
11	Depreciation Cost (DC)	
	(a) Excluding Taxes	$DC_{ET} = \frac{154.84}{UPD}$
	(b) Including Taxes	$DC_{IT} = \frac{256.80}{UPD}$
12	Crew Cost (CW)	$CW = \frac{1500}{UPD}$
13	Commodity Holding Cost (CHC)	
	(a) Single Lane and Intermediate Lane	$CHC_{HCV}^{SL_IL} = \frac{182.79}{UPD}$
	(b) Two Lane	$CHC_{HCV}^{2L} = \frac{218.75}{UPD}$
	(c) Multi-Lane Roads	$CHC_{HCV}^{ML} = \frac{1084.14}{UPD}$
	(d) Expressways	$CHC_{HCV}^{EW} = \frac{1084.14}{UPD}$

Table B.7 VOC and Commodity Holding Cost Equations for Multi Axle Heavy Commercial Vehicles (MCVs)

S. No.	VOC Component	Equation					
1	Fuel Consumption (FC)	FC = 90.0 + 14489.919/V + 0.0216 * V ² + 0.01 * RG +					
		8.217 * RS - 8.8272 * FL - 13.113 * (PWR)					
2	Spare Parts Cost (SP)						
	(a) Excluding Taxes	$\frac{SP_{ET}}{NP_{ET}} = e^{(-9.492638 + 0.0001413 * RG + 3.493/W)}$					
	(b) Including Taxes	$\frac{SP_{IT}}{NP_{IT}} = e^{(-9.492638 + 0.0001413 * RG + 3.493/W)}$					
3	Maintenance Labour (LC)	LC = 0.7912 * SP					
4	Tyre Life (TL)	TL = 23726+4046*W-398*RF-1.0099*RG					
5	Engine Oil (EOL)	EOL = 1.3826+0.03348*RF+0.002319*(RG/W)					
6	Other Oil (OL)	OL = 5.1037+0.0002646*RG					
7	Grease (G)	G = 0.9153+0.0707*RF+0.000627*RG					

8	Speed (V)	
	(a) Single Lane (b) Intermediate Lane (c) Two Lane (d) Four Lane (e) Six Lane (f) Eight Lane (g) Expressway	$\begin{array}{l} {\sf V}_{\sf MAV}^{\sf \ SL} = 38.27 \text{-} (0.3412 \text{*RF}) \text{-} 0.00068 \text{*} (RG-2000) \\ {\sf V}_{\sf MAV}^{\sf \ IL} = 42.01 \text{-} (0.3753 \text{*RF}) \text{-} 0.00074 \text{*} (RG-2000) \\ {\sf V}_{\sf MAV}^{\sf \ 2L} = 44.79 \text{-} (0.3994 \text{*RF}) \text{-} 0.00079 \text{*} (RG-2000) \\ {\sf V}_{\sf MAV}^{\sf \ 4L} = 74.16 \text{-} 0.6405 \text{*RF-0.00128 RG} \\ {\sf V}_{\sf MAV}^{\sf \ 6L} = 76.60 \text{-} 0.6405 \text{*RF-0. 00128 RG} \\ {\sf V}_{\sf MAV}^{\sf \ 8L} = 79.03 \text{-} 0.6405 \text{*RF-0. 00128 RG} \\ {\sf V}_{\sf MAV}^{\sf \ EW} = 69.29 \text{-} 0.6405 \text{*RF-0.00128 *RG+0.696 *W}_{\sf D} \\ \textit{Where W_D is Width of Carriageway in one direction (in m)} \end{array}$
9	Utilisation (UPD)	UPD = $77.7233+5.8915*V_{MCV}j$ Where $j = SL$, IL , $2L$, $4L$, $6L$, $8L$, EW
10	Fixed Cost (FXC)	
	(a) Excluding Taxes	$FXC_{ET} = \frac{1238.26}{UPD}$
	(b) Including Taxes	$FXC_{IT} = \frac{1479.30}{UPD}$
11	Depreciation Cost (DC)	
	(a) Excluding Taxes	$DC_{ET} = \frac{238.54}{UPD}$
	(b) Including Taxes	$DC_{IT} = \frac{425.84}{UPD}$
12	Crew Cost (CW)	$CW = \frac{1800}{UPD}$
13	Commodity Holding Cost (CHC)	
	(a) Two Lane	$CHC_{MCV}^{2L} = \frac{409.28}{UPD}$
	(b) Multi-Lane Roads	$CHC_{MCV}^{ML} = \frac{1707.37}{UPD}$
	(c) Expressways	$CHC_{MCV}^{EW} = \frac{1707.37}{UPD}$

CURRENT VEHICLE OPERATING COST INPUTS

The unit prices of different VOC inputs as per March, 2019 price levels are presented in C.1. To calculate VOC for each vehicle type, these unit costs of VOC components need to be utilised. These can be used for future years by applying Wholesale Price Index (WPI) values periodically published by the Ministry of Commerce and Industry⁵. Economic costs which exclude taxes, whereas financial costs include taxes. The costs presented in this annex are for free traffic flow conditions. For congested conditions, they should be increased by using appropriate factors recommended in paragraph 6.9.

Table C.1 Current Vehicle Operating Cost Inputs

S. No.	VOC Inputs	Price without Taxes	Price with Taxes	
	A. Cost of New Vehic	cles		
1	Two Wheelers	34209	61235	
2	Cars			
i)	Small Cars	273728	489972	
ii)	Big Cars	558599	999892	
3	Buses	1647150	2948400	
4	Light Commercial Vehicles	449721	805000	
5	Heavy Commercial Vehicles	940531	1683550	
6	Multi-Axle Heavy Commercial Vehicles	1415350 2533475		
	B. Cost of Petroleum Pr	oducts		
1	Petrol (per litre)	33.58	79.92	
2	Diesel (per litre)	30.51	72.61	
3	Engine Oil (per litre)	187.96	384.39	
4	Other Oil (per litre)	167.70	338.78	
5	Grease (per kg)	183.70	390.90	
	C. Cost of New Tyre	es		
1	Two Wheelers	1355	1668	
2	Cars	2940	4456	
3	Buses	13475	17500	
4	LCVs	5420	8900	
5	HCVs and MCVs	13890	20000	

(All Prices in ₹)

VOC TABLES

Table VOC Small Cars 1 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Time Cost	Grand Cost
0	1.97	0.22	0.41	0.04	0.05	0.00	0.00	1.16	0.13	3.98	4.82	8.80
5	1.96	0.22	0.45	0.05	0.07	0.00	0.00	1.23	0.13	4.10	5.08	9.19
10	1.95	0.22	0.48	0.05	0.09	0.00	0.00	1.30	0.14	4.24	5.38	9.62
15	1.95	0.22	0.51	0.06	0.11	0.00	0.00	1.38	0.15	4.39	5.71	10.10
20	1.96	0.23	0.55	0.06	0.13	0.00	0.00	1.47	0.16	4.55	6.09	10.65
25	1.97	0.23	0.58	0.07	0.14	0.00	0.00	1.58	0.17	4.74	6.53	11.27
30	1.99	0.23	0.62	0.07	0.16	0.00	0.00	1.70	0.18	4.96	7.02	11.98
35	2.02	0.24	0.65	0.07	0.18	0.00	0.00	1.84	0.20	5.20	7.61	12.81
40	2.07	0.24	0.69	0.08	0.20	0.00	0.00	2.00	0.22	5.49	8.29	13.78
45	2.12	0.25	0.72	0.08	0.22	0.00	0.00	2.20	0.24	5.83	9.11	14.95
50	2.20	0.25	0.76	0.09	0.24	0.00	0.00	2.44	0.26	6.24	10.12	16.35

Table VOC Small Cars 2 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.00	0.25	0.44	0.05	0.05	0.21	0.37	1.22	0.13	4.71	5.03	9.75
5	1.99	0.25	0.47	0.06	0.07	0.21	0.37	1.29	0.14	4.84	5.33	10.17
10	1.99	0.26	0.51	0.06	0.09	0.21	0.37	1.37	0.15	4.99	5.65	10.65
15	1.99	0.26	0.54	0.07	0.11	0.21	0.37	1.46	0.16	5.16	6.03	11.18
20	2.00	0.26	0.58	0.07	0.13	0.21	0.37	1.56	0.17	5.34	6.45	11.79
25	2.02	0.27	0.61	0.07	0.14	0.21	0.37	1.67	0.18	5.55	6.93	12.49
30	2.05	0.27	0.65	0.08	0.16	0.21	0.37	1.81	0.20	5.80	7.50	13.30
35	2.09	0.28	0.68	0.08	0.18	0.21	0.37	1.97	0.21	6.08	8.17	14.24
40	2.15	0.28	0.72	0.09	0.20	0.21	0.37	2.16	0.23	6.41	8.96	15.37
45	2.22	0.29	0.75	0.09	0.22	0.21	0.37	2.40	0.26	6.80	9.93	16.73
50	2.32	0.29	0.78	0.10	0.24	0.21	0.37	2.69	0.29	7.28	11.14	18.42

Table VOC Small Cars 3 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.03	0.29	0.47	0.06	0.05	0.41	0.74	1.27	0.14	5.46	5.27	10.74
5	2.02	0.30	0.50	0.07	0.07	0.41	0.74	1.35	0.15	5.61	5.60	11.20
10	2.03	0.30	0.54	0.07	0.09	0.41	0.74	1.44	0.16	5.77	5.96	11.73
15	2.04	0.31	0.57	0.07	0.11	0.41	0.74	1.54	0.17	5.95	6.37	12.33
20	2.06	0.32	0.61	0.08	0.13	0.41	0.74	1.65	0.18	6.16	6.85	13.01
25	2.08	0.32	0.64	0.08	0.14	0.41	0.74	1.79	0.19	6.40	7.40	13.80
30	2.12	0.33	0.68	0.09	0.16	0.41	0.74	1.94	0.21	6.68	8.05	14.72
35	2.17	0.34	0.71	0.09	0.18	0.41	0.74	2.13	0.23	7.00	8.82	15.82
40	2.24	0.34	0.74	0.10	0.20	0.41	0.74	2.36	0.25	7.38	9.75	17.14
45	2.33	0.35	0.78	0.10	0.22	0.41	0.74	2.64	0.29	7.85	10.91	18.76
50	2.46	0.36	0.81	0.10	0.24	0.41	0.74	2.99	0.32	8.43	12.38	20.81

Table VOC Small Cars 4 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.06	0.35	0.50	0.07	0.05	0.62	1.11	1.34	0.14	6.24	5.54	11.78
5	2.06	0.36	0.53	0.07	0.07	0.62	1.11	1.42	0.15	6.40	5.89	12.30
10	2.07	0.37	0.57	0.08	0.09	0.62	1.11	1.52	0.16	6.59	6.30	12.88
15	2.09	0.38	0.60	0.08	0.11	0.62	1.11	1.63	0.18	6.79	6.76	13.55
20	2.11	0.39	0.64	0.09	0.13	0.62	1.11	1.76	0.19	7.03	7.30	14.33
25	2.15	0.40	0.67	0.09	0.14	0.62	1.11	1.91	0.21	7.30	7.93	15.23
30	2.20	0.41	0.70	0.10	0.16	0.62	1.11	2.10	0.23	7.62	8.68	16.29
35	2.26	0.42	0.74	0.10	0.18	0.62	1.11	2.31	0.25	7.99	9.58	17.57
40	2.35	0.43	0.77	0.10	0.20	0.62	1.11	2.58	0.28	8.45	10.70	19.14
45	2.47	0.44	0.81	0.11	0.22	0.62	1.11	2.92	0.32	9.01	12.11	21.12
50	2.63	0.46	0.84	0.11	0.24	0.62	1.11	3.37	0.36	9.73	13.94	23.67

Table VOC Small Cars 5 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.10	0.45	0.53	0.08	0.05	0.82	1.48	1.41	0.15	7.06	5.83	12.89
5	2.10	0.47	0.56	0.08	0.07	0.82	1.48	1.50	0.16	7.25	6.23	13.47
10	2.12	0.48	0.60	0.09	0.09	0.82	1.48	1.61	0.17	7.46	6.68	14.13
15	2.14	0.49	0.63	0.09	0.11	0.82	1.48	1.74	0.19	7.69	7.20	14.89
20	2.18	0.51	0.66	0.09	0.13	0.82	1.48	1.89	0.20	7.96	7.81	15.78
25	2.22	0.53	0.70	0.10	0.14	0.82	1.48	2.06	0.22	8.28	8.54	16.82
30	2.29	0.54	0.73	0.10	0.16	0.82	1.48	2.27	0.25	8.65	9.42	18.07
35	2.37	0.56	0.77	0.11	0.18	0.82	1.48	2.53	0.27	9.10	10.49	19.59
40	2.48	0.58	0.80	0.11	0.20	0.82	1.48	2.86	0.31	9.65	11.84	21.49
45	2.63	0.61	0.84	0.12	0.22	0.82	1.48	3.28	0.36	10.35	13.59	23.94
50	2.84	0.63	0.87	0.12	0.24	0.82	1.48	3.85	0.42	11.27	15.95	27.22

Table VOC Small Cars 6 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.14	0.62	0.56	0.09	0.05	1.03	1.85	1.49	0.16	7.97	6.15	14.13
5	2.15	0.65	0.59	0.09	0.07	1.03	1.85	1.59	0.17	8.19	6.60	14.79
10	2.17	0.68	0.63	0.09	0.09	1.03	1.85	1.72	0.19	8.43	7.11	15.54
15	2.21	0.71	0.66	0.10	0.11	1.03	1.85	1.86	0.20	8.71	7.70	16.41
20	2.25	0.74	0.69	0.10	0.13	1.03	1.85	2.03	0.22	9.04	8.41	17.44
25	2.31	0.77	0.73	0.11	0.14	1.03	1.85	2.23	0.24	9.41	9.25	18.67
30	2.39	0.81	0.76	0.11	0.16	1.03	1.85	2.49	0.27	9.87	10.29	20.16
35	2.50	0.86	0.80	0.12	0.18	1.03	1.85	2.80	0.30	10.42	11.59	22.01
40	2.64	0.91	0.83	0.12	0.20	1.03	1.85	3.20	0.35	11.12	13.26	24.38
45	2.83	0.96	0.87	0.12	0.22	1.03	1.85	3.74	0.41	12.02	15.50	27.52
50	3.11	1.02	0.90	0.13	0.24	1.03	1.85	4.50	0.49	13.26	18.64	31.91

Table VOC Small Cars 7 Economic Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	-	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.18	1.00	0.59	0.09	0.05	1.23	2.22	1.57	0.17	9.11	6.52	15.62
5	2.21	1.07	0.62	0.10	0.07	1.23	2.22	1.69	0.18	9.39	7.01	16.40
10	2.24	1.14	0.65	0.10	0.09	1.23	2.22	1.83	0.20	9.70	7.59	17.30
15	2.28	1.23	0.69	0.11	0.11	1.23	2.22	2.00	0.22	10.08	8.28	18.36
20	2.34	1.33	0.72	0.11	0.13	1.23	2.22	2.20	0.24	10.51	9.10	19.61
25	2.41	1.46	0.76	0.12	0.14	1.23	2.22	2.44	0.26	11.04	10.10	21.13
30	2.51	1.60	0.79	0.12	0.16	1.23	2.22	2.74	0.30	11.67	11.35	23.02
35	2.65	1.78	0.83	0.12	0.18	1.23	2.22	3.13	0.34	12.47	12.94	25.42
40	2.83	2.01	0.86	0.13	0.20	1.23	2.22	3.64	0.39	13.51	15.07	28.58
45	3.09	2.30	0.89	0.13	0.22	1.23	2.22	4.35	0.47	14.91	18.02	32.93
50	3.49	2.69	0.93	0.14	0.24	1.23	2.22	5.41	0.59	16.93	22.42	39.35

Table VOC Small Cars 8 Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.03	0.20	0.39	0.04	0.05	0.00	0.00	1.05	0.11	3.87	4.35	8.22
5	2.01	0.20	0.43	0.04	0.07	0.00	0.00	1.10	0.12	3.97	4.58	8.55
10	1.99	0.20	0.46	0.05	0.09	0.00	0.00	1.17	0.13	4.08	4.83	8.91
15	1.97	0.21	0.50	0.05	0.11	0.00	0.00	1.23	0.13	4.20	5.11	9.32
20	1.97	0.21	0.53	0.06	0.13	0.00	0.00	1.31	0.14	4.34	5.43	9.77
25	1.97	0.21	0.57	0.06	0.14	0.00	0.00	1.40	0.15	4.50	5.79	10.29
30	1.97	0.22	0.60	0.06	0.16	0.00	0.00	1.50	0.16	4.68	6.20	10.88
35	1.99	0.22	0.63	0.07	0.18	0.00	0.00	1.61	0.17	4.88	6.68	11.56
40	2.02	0.22	0.67	0.07	0.20	0.00	0.00	1.75	0.19	5.11	7.23	12.35
45	2.05	0.22	0.70	0.08	0.22	0.00	0.00	1.90	0.21	5.39	7.89	13.27
50	2.10	0.23	0.74	0.08	0.24	0.00	0.00	2.09	0.23	5.71	8.67	14.38

Table VOC Small Cars 9 Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.05	0.22	0.41	0.04	0.05	0.21	0.37	1.08	0.12	4.55	4.48	9.03
5	2.03	0.22	0.45	0.05	0.07	0.21	0.37	1.14	0.12	4.66	4.73	9.38
10	2.02	0.22	0.48	0.05	0.09	0.21	0.37	1.21	0.13	4.77	5.00	9.77
15	2.01	0.23	0.52	0.06	0.11	0.21	0.37	1.28	0.14	4.91	5.30	10.21
20	2.00	0.23	0.55	0.06	0.13	0.21	0.37	1.36	0.15	5.06	5.65	10.70
25	2.01	0.23	0.58	0.07	0.14	0.21	0.37	1.46	0.16	5.23	6.04	11.26
30	2.02	0.24	0.62	0.07	0.16	0.21	0.37	1.57	0.17	5.42	6.49	11.90
35	2.04	0.24	0.65	0.07	0.18	0.21	0.37	1.69	0.18	5.64	7.01	12.65
40	2.07	0.24	0.69	0.08	0.20	0.21	0.37	1.84	0.20	5.90	7.62	13.52
45	2.12	0.25	0.72	0.08	0.22	0.21	0.37	2.02	0.22	6.20	8.35	14.55
50	2.18	0.25	0.76	0.09	0.24	0.21	0.37	2.23	0.24	6.56	9.23	15.79

Table VOC Small Cars 10 Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	_	Other Oil	Grease Cost	Spare Parts	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
			Cost	Cost		Cost						
0	2.08	0.24	0.43	0.05	0.05	0.41	0.74	1.12	0.12	5.24	4.63	9.87
5	2.06	0.24	0.47	0.05	0.07	0.41	0.74	1.18	0.13	5.35	4.89	10.24
10	2.05	0.25	0.50	0.06	0.09	0.41	0.74	1.25	0.14	5.48	5.18	10.66
15	2.04	0.25	0.54	0.06	0.11	0.41	0.74	1.33	0.14	5.62	5.51	11.13
20	2.04	0.25	0.57	0.07	0.13	0.41	0.74	1.42	0.15	5.78	5.88	11.66
25	2.05	0.26	0.60	0.07	0.14	0.41	0.74	1.52	0.16	5.97	6.30	12.27
30	2.07	0.26	0.64	0.08	0.16	0.41	0.74	1.64	0.18	6.18	6.79	12.97
35	2.10	0.27	0.67	0.08	0.18	0.41	0.74	1.78	0.19	6.42	7.37	13.79
40	2.14	0.27	0.71	0.08	0.20	0.41	0.74	1.94	0.21	6.70	8.05	14.75
45	2.19	0.28	0.74	0.09	0.22	0.41	0.74	2.14	0.23	7.04	8.87	15.91
50	2.27	0.28	0.78	0.09	0.24	0.41	0.74	2.38	0.26	7.44	9.87	17.32

Table VOC Small Cars 11 Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.10	0.26	0.45	0.06	0.05	0.62	1.11	1.16	0.13	5.93	4.78	10.71
5	2.09	0.27	0.49	0.06	0.07	0.62	1.11	1.22	0.13	6.05	5.06	11.12
10	2.08	0.27	0.52	0.06	0.09	0.62	1.11	1.30	0.14	6.19	5.37	11.57
15	2.08	0.28	0.56	0.07	0.11	0.62	1.11	1.38	0.15	6.35	5.73	12.07
20	2.08	0.28	0.59	0.07	0.13	0.62	1.11	1.48	0.16	6.52	6.13	12.65
25	2.10	0.29	0.62	0.08	0.14	0.62	1.11	1.59	0.17	6.72	6.59	13.32
30	2.12	0.29	0.66	0.08	0.16	0.62	1.11	1.72	0.19	6.95	7.13	14.09
35	2.16	0.30	0.69	0.09	0.18	0.62	1.11	1.88	0.20	7.22	7.77	14.99
40	2.21	0.30	0.73	0.09	0.20	0.62	1.11	2.06	0.22	7.53	8.53	16.07
45	2.27	0.31	0.76	0.09	0.22	0.62	1.11	2.28	0.25	7.91	9.46	17.37
50	2.36	0.32	0.80	0.10	0.24	0.62	1.11	2.56	0.28	8.37	10.61	18.98

Table VOC Small Cars 12 Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.13	0.30	0.47	0.06	0.05	0.82	1.48	1.20	0.13	6.64	4.95	11.59
5	2.12	0.30	0.51	0.07	0.07	0.82	1.48	1.27	0.14	6.77	5.25	12.02
10	2.12	0.31	0.54	0.07	0.09	0.82	1.48	1.35	0.15	6.92	5.59	12.50
15	2.12	0.31	0.58	0.07	0.11	0.82	1.48	1.44	0.16	7.09	5.97	13.05
20	2.13	0.32	0.61	0.08	0.13	0.82	1.48	1.55	0.17	7.28	6.41	13.68
25	2.15	0.33	0.64	0.08	0.14	0.82	1.48	1.67	0.18	7.50	6.91	14.41
30	2.18	0.33	0.68	0.09	0.16	0.82	1.48	1.81	0.20	7.75	7.51	15.26
35	2.22	0.34	0.71	0.09	0.18	0.82	1.48	1.98	0.21	8.05	8.22	16.27
40	2.28	0.35	0.75	0.10	0.20	0.82	1.48	2.19	0.24	8.40	9.07	17.47
45	2.36	0.36	0.78	0.10	0.22	0.82	1.48	2.45	0.26	8.83	10.13	18.96
50	2.47	0.36	0.82	0.10	0.24	0.82	1.48	2.77	0.30	9.36	11.46	20.82

Table VOC Small Cars 13
Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.16	0.34	0.49	0.07	0.05	1.03	1.85	1.24	0.13	7.36	5.13	12.48
5	2.15	0.35	0.53	0.07	0.07	1.03	1.85	1.32	0.14	7.50	5.45	12.95
10	2.15	0.35	0.56	0.08	0.09	1.03	1.85	1.40	0.15	7.66	5.81	13.47
15	2.16	0.36	0.59	0.08	0.11	1.03	1.85	1.50	0.16	7.85	6.23	14.07
20	2.18	0.37	0.63	0.08	0.13	1.03	1.85	1.62	0.18	8.06	6.71	14.76
25	2.20	0.38	0.66	0.09	0.14	1.03	1.85	1.76	0.19	8.30	7.27	15.56
30	2.24	0.39	0.70	0.09	0.16	1.03	1.85	1.91	0.21	8.58	7.93	16.51
35	2.29	0.40	0.73	0.10	0.18	1.03	1.85	2.11	0.23	8.91	8.72	17.63
40	2.36	0.41	0.77	0.10	0.20	1.03	1.85	2.34	0.25	9.31	9.69	19.00
45	2.46	0.42	0.80	0.11	0.22	1.03	1.85	2.63	0.29	9.79	10.90	20.70
50	2.59	0.43	0.84	0.11	0.24	1.03	1.85	3.01	0.33	10.41	12.46	22.87

Table VOC Small Cars 14
Economic Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.19	0.39	0.51	0.07	0.05	1.23	2.22	1.28	0.14	8.09	5.32	13.41
5	2.19	0.40	0.55	0.08	0.07	1.23	2.22	1.37	0.15	8.25	5.67	13.92
10	2.19	0.41	0.58	0.08	0.09	1.23	2.22	1.46	0.16	8.43	6.06	14.49
15	2.21	0.42	0.61	0.09	0.11	1.23	2.22	1.57	0.17	8.63	6.51	15.14
20	2.23	0.44	0.65	0.09	0.13	1.23	2.22	1.70	0.18	8.86	7.04	15.90
25	2.26	0.45	0.68	0.09	0.14	1.23	2.22	1.85	0.20	9.13	7.66	16.79
30	2.31	0.46	0.72	0.10	0.16	1.23	2.22	2.03	0.22	9.44	8.40	17.84
35	2.37	0.48	0.75	0.10	0.18	1.23	2.22	2.24	0.24	9.82	9.29	19.11
40	2.46	0.49	0.79	0.11	0.20	1.23	2.22	2.51	0.27	10.27	10.40	20.67
45	2.57	0.51	0.82	0.11	0.22	1.23	2.22	2.85	0.31	10.84	11.81	22.64
50	2.73	0.52	0.86	0.12	0.24	1.23	2.22	3.30	0.36	11.56	13.66	25.22

Table VOC Small Cars 15 Economic Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.11	0.19	0.38	0.04	0.05	0.00	0.00	0.95	0.10	3.82	5.26	9.09
5	2.07	0.19	0.42	0.04	0.07	0.00	0.00	0.99	0.11	3.90	5.53	9.43
10	2.04	0.20	0.45	0.04	0.09	0.00	0.00	1.05	0.11	3.99	5.83	9.82
15	2.02	0.20	0.49	0.05	0.11	0.00	0.00	1.11	0.12	4.09	6.16	10.25
20	2.00	0.20	0.52	0.05	0.13	0.00	0.00	1.17	0.13	4.20	6.54	10.74
25	1.99	0.20	0.56	0.06	0.14	0.00	0.00	1.25	0.14	4.33	6.96	11.29
30	1.98	0.21	0.59	0.06	0.16	0.00	0.00	1.34	0.14	4.48	7.43	11.92
35	1.98	0.21	0.63	0.07	0.18	0.00	0.00	1.43	0.16	4.65	7.98	12.63
40	1.99	0.21	0.66	0.07	0.20	0.00	0.00	1.55	0.17	4.85	8.61	13.46
45	2.01	0.22	0.69	0.08	0.22	0.00	0.00	1.68	0.18	5.08	9.36	14.44
50	2.05	0.22	0.73	0.08	0.24	0.00	0.00	1.84	0.20	5.35	10.24	15.59

Table VOC Small Cars 16 Economic Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.13	0.21	0.40	0.04	0.05	0.21	0.37	0.97	0.10	4.48	5.39	9.87
5	2.10	0.21	0.43	0.05	0.07	0.21	0.37	1.02	0.11	4.56	5.67	10.23
10	2.07	0.21	0.47	0.05	0.09	0.21	0.37	1.08	0.12	4.65	5.99	10.64
15	2.05	0.21	0.50	0.05	0.11	0.21	0.37	1.14	0.12	4.76	6.34	11.10
20	2.03	0.22	0.54	0.06	0.13	0.21	0.37	1.21	0.13	4.88	6.73	11.61
25	2.02	0.22	0.57	0.06	0.14	0.21	0.37	1.29	0.14	5.02	7.18	12.20
30	2.02	0.22	0.61	0.07	0.16	0.21	0.37	1.38	0.15	5.18	7.68	12.87
35	2.02	0.23	0.64	0.07	0.18	0.21	0.37	1.49	0.16	5.36	8.27	13.64
40	2.04	0.23	0.68	0.08	0.20	0.21	0.37	1.61	0.17	5.58	8.96	14.53
45	2.07	0.23	0.71	0.08	0.22	0.21	0.37	1.75	0.19	5.82	9.76	15.59
50	2.11	0.24	0.74	0.08	0.24	0.21	0.37	1.93	0.21	6.12	10.73	16.85

Table VOC Small Cars 17 Economic Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.15	0.22	0.42	0.05	0.05	0.41	0.74	0.99	0.11	5.13	5.52	10.66
5	2.12	0.22	0.45	0.05	0.07	0.41	0.74	1.05	0.11	5.22	5.82	11.04
10	2.10	0.23	0.48	0.05	0.09	0.41	0.74	1.10	0.12	5.32	6.15	11.47
15	2.08	0.23	0.52	0.06	0.11	0.41	0.74	1.17	0.13	5.44	6.52	11.96
20	2.06	0.23	0.55	0.06	0.13	0.41	0.74	1.25	0.13	5.57	6.94	12.50
25	2.06	0.24	0.59	0.07	0.14	0.41	0.74	1.33	0.14	5.72	7.41	13.13
30	2.06	0.24	0.62	0.07	0.16	0.41	0.74	1.43	0.15	5.89	7.96	13.84
35	2.07	0.24	0.66	0.08	0.18	0.41	0.74	1.54	0.17	6.08	8.59	14.67
40	2.09	0.25	0.69	0.08	0.20	0.41	0.74	1.68	0.18	6.31	9.33	15.64
45	2.12	0.25	0.73	0.08	0.22	0.41	0.74	1.83	0.20	6.58	10.20	16.78
50	2.17	0.26	0.76	0.09	0.24	0.41	0.74	2.02	0.22	6.90	11.26	18.17

Table VOC Small Cars 18 Economic Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.18	0.24	0.43	0.05	0.05	0.62	1.11	1.02	0.11	5.80	5.66	11.46
5	2.15	0.24	0.47	0.05	0.07	0.62	1.11	1.07	0.12	5.89	5.97	11.86
10	2.12	0.24	0.50	0.06	0.09	0.62	1.11	1.14	0.12	6.00	6.32	12.32
15	2.11	0.25	0.53	0.06	0.11	0.62	1.11	1.21	0.13	6.12	6.71	12.83
20	2.10	0.25	0.57	0.07	0.13	0.62	1.11	1.29	0.14	6.26	7.16	13.42
25	2.09	0.26	0.60	0.07	0.14	0.62	1.11	1.38	0.15	6.42	7.66	14.08
30	2.10	0.26	0.64	0.08	0.16	0.62	1.11	1.48	0.16	6.60	8.25	14.85
35	2.11	0.26	0.67	0.08	0.18	0.62	1.11	1.60	0.17	6.81	8.92	15.74
40	2.14	0.27	0.71	0.08	0.20	0.62	1.11	1.75	0.19	7.06	9.73	16.79
45	2.18	0.27	0.74	0.09	0.22	0.62	1.11	1.92	0.21	7.35	10.69	18.04
50	2.24	0.28	0.78	0.09	0.24	0.62	1.11	2.13	0.23	7.70	11.86	19.56

Table VOC Small Cars 19 Economic Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.20	0.26	0.45	0.05	0.05	0.82	1.48	1.04	0.11	6.46	5.81	12.27
5	2.17	0.26	0.48	0.06	0.07	0.82	1.48	1.10	0.12	6.56	6.13	12.70
10	2.15	0.26	0.52	0.06	0.09	0.82	1.48	1.17	0.13	6.68	6.50	13.18
15	2.14	0.27	0.55	0.07	0.11	0.82	1.48	1.24	0.13	6.81	6.92	13.73
20	2.13	0.27	0.58	0.07	0.13	0.82	1.48	1.33	0.14	6.96	7.39	14.35
25	2.13	0.28	0.62	0.08	0.14	0.82	1.48	1.42	0.15	7.13	7.93	15.06
30	2.14	0.28	0.65	0.08	0.16	0.82	1.48	1.54	0.17	7.33	8.56	15.88
35	2.16	0.29	0.69	0.08	0.18	0.82	1.48	1.67	0.18	7.55	9.29	16.85
40	2.20	0.29	0.72	0.09	0.20	0.82	1.48	1.83	0.20	7.82	10.16	17.99
45	2.24	0.30	0.76	0.09	0.22	0.82	1.48	2.02	0.22	8.14	11.22	19.36
50	2.31	0.31	0.79	0.10	0.24	0.82	1.48	2.25	0.24	8.53	12.51	21.04

Table VOC Small Cars 20 Economic Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.19	0.38	0.04	0.05	0.00	0.00	0.82	0.09	3.85	6.91	10.76
5	2.26	0.19	0.42	0.04	0.07	0.00	0.00	0.83	0.09	3.91	7.06	10.97
10	2.24	0.20	0.45	0.04	0.09	0.00	0.00	0.85	0.09	3.97	7.21	11.18
15	2.22	0.20	0.49	0.05	0.11	0.00	0.00	0.87	0.09	4.03	7.37	11.40
20	2.20	0.20	0.52	0.05	0.13	0.00	0.00	0.89	0.10	4.09	7.54	11.64
25	2.18	0.20	0.56	0.06	0.14	0.00	0.00	0.91	0.10	4.16	7.72	11.88
30	2.17	0.21	0.59	0.06	0.16	0.00	0.00	0.93	0.10	4.23	7.90	12.13
35	2.15	0.21	0.63	0.07	0.18	0.00	0.00	0.96	0.10	4.30	8.10	12.39
40	2.14	0.21	0.66	0.07	0.20	0.00	0.00	0.98	0.11	4.37	8.30	12.67
45	2.13	0.22	0.69	0.08	0.22	0.00	0.00	1.01	0.11	4.44	8.52	12.96
50	2.11	0.22	0.73	0.08	0.24	0.00	0.00	1.03	0.11	4.52	8.74	13.26

Table VOC Small Cars 21 Economic Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.21	0.40	0.04	0.05	0.21	0.37	0.85	0.09	4.49	7.16	11.65
5	2.26	0.21	0.43	0.05	0.07	0.21	0.37	0.87	0.09	4.55	7.32	11.87
10	2.24	0.21	0.47	0.05	0.09	0.21	0.37	0.88	0.10	4.61	7.49	12.10
15	2.22	0.21	0.50	0.05	0.11	0.21	0.37	0.91	0.10	4.67	7.66	12.33
20	2.20	0.22	0.54	0.06	0.13	0.21	0.37	0.93	0.10	4.74	7.84	12.58
25	2.19	0.22	0.57	0.06	0.14	0.21	0.37	0.95	0.10	4.81	8.03	12.85
30	2.17	0.22	0.61	0.07	0.16	0.21	0.37	0.97	0.11	4.88	8.23	13.12
35	2.16	0.23	0.64	0.07	0.18	0.21	0.37	1.00	0.11	4.96	8.45	13.40
40	2.15	0.23	0.68	0.08	0.20	0.21	0.37	1.02	0.11	5.04	8.67	13.70
45	2.14	0.23	0.71	0.08	0.22	0.21	0.37	1.05	0.11	5.12	8.90	14.02
50	2.13	0.24	0.74	0.08	0.24	0.21	0.37	1.08	0.12	5.20	9.15	14.35

Table VOC Small Cars 22 Economic Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.27	0.22	0.42	0.05	0.05	0.41	0.74	0.88	0.10	5.13	7.43	12.56
5	2.25	0.22	0.45	0.05	0.07	0.41	0.74	0.90	0.10	5.19	7.60	12.79
10	2.24	0.23	0.48	0.05	0.09	0.41	0.74	0.92	0.10	5.26	7.78	13.04
15	2.22	0.23	0.52	0.06	0.11	0.41	0.74	0.94	0.10	5.33	7.97	13.30
20	2.21	0.23	0.55	0.06	0.13	0.41	0.74	0.97	0.10	5.40	8.17	13.57
25	2.19	0.24	0.59	0.07	0.14	0.41	0.74	0.99	0.11	5.47	8.38	13.85
30	2.18	0.24	0.62	0.07	0.16	0.41	0.74	1.02	0.11	5.55	8.59	14.14
35	2.17	0.24	0.66	0.08	0.18	0.41	0.74	1.04	0.11	5.63	8.82	14.45
40	2.16	0.25	0.69	0.08	0.20	0.41	0.74	1.07	0.12	5.71	9.07	14.78
45	2.15	0.25	0.73	0.08	0.22	0.41	0.74	1.10	0.12	5.80	9.32	15.12
50	2.14	0.26	0.76	0.09	0.24	0.41	0.74	1.13	0.12	5.89	9.59	15.48

Table VOC Small Cars 23 Economic Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.29	0.18	0.37	0.03	0.05	0.00	0.00	0.81	0.09	3.83	6.87	10.70
5	2.27	0.19	0.41	0.04	0.07	0.00	0.00	0.83	0.09	3.89	7.01	10.90
10	2.25	0.19	0.44	0.04	0.09	0.00	0.00	0.85	0.09	3.95	7.16	11.11
15	2.23	0.19	0.48	0.05	0.11	0.00	0.00	0.86	0.09	4.01	7.32	11.33
20	2.21	0.19	0.51	0.05	0.13	0.00	0.00	0.88	0.10	4.07	7.48	11.55
25	2.19	0.20	0.55	0.05	0.14	0.00	0.00	0.90	0.10	4.14	7.65	11.78
30	2.18	0.20	0.58	0.06	0.16	0.00	0.00	0.93	0.10	4.20	7.83	12.03
35	2.16	0.20	0.62	0.06	0.18	0.00	0.00	0.95	0.10	4.27	8.01	12.28
40	2.15	0.20	0.65	0.07	0.20	0.00	0.00	0.97	0.11	4.34	8.21	12.55
45	2.14	0.21	0.68	0.07	0.22	0.00	0.00	0.99	0.11	4.42	8.41	12.83
50	2.12	0.21	0.72	0.08	0.24	0.00	0.00	1.02	0.11	4.49	8.63	13.12

Table VOC Small Cars 24 Economic Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.19	0.38	0.04	0.05	0.21	0.37	0.84	0.09	4.46	7.11	11.57
5	2.26	0.19	0.42	0.04	0.07	0.21	0.37	0.86	0.09	4.52	7.26	11.78
10	2.25	0.20	0.45	0.04	0.09	0.21	0.37	0.88	0.09	4.58	7.42	12.00
15	2.23	0.20	0.49	0.05	0.11	0.21	0.37	0.90	0.10	4.64	7.59	12.23
20	2.21	0.20	0.52	0.05	0.13	0.21	0.37	0.92	0.10	4.71	7.77	12.47
25	2.20	0.20	0.56	0.06	0.14	0.21	0.37	0.94	0.10	4.78	7.95	12.73
30	2.18	0.21	0.59	0.06	0.16	0.21	0.37	0.96	0.10	4.85	8.14	12.99
35	2.17	0.21	0.63	0.07	0.18	0.21	0.37	0.99	0.11	4.92	8.34	13.26
40	2.16	0.21	0.66	0.07	0.20	0.21	0.37	1.01	0.11	4.99	8.56	13.55
45	2.15	0.22	0.69	0.08	0.22	0.21	0.37	1.04	0.11	5.07	8.78	13.85
50	2.14	0.22	0.73	0.08	0.24	0.21	0.37	1.07	0.12	5.15	9.01	14.17

Table VOC Small Cars 25 Economic Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.28	0.20	0.39	0.04	0.05	0.41	0.74	0.87	0.09	5.08	7.37	12.45
5	2.26	0.20	0.43	0.04	0.07	0.41	0.74	0.89	0.10	5.15	7.54	12.68
10	2.25	0.21	0.46	0.05	0.09	0.41	0.74	0.91	0.10	5.21	7.71	12.92
15	2.23	0.21	0.50	0.05	0.11	0.41	0.74	0.93	0.10	5.28	7.89	13.17
20	2.22	0.21	0.53	0.06	0.13	0.41	0.74	0.95	0.10	5.35	8.08	13.43
25	2.20	0.21	0.57	0.06	0.14	0.41	0.74	0.98	0.11	5.42	8.28	13.70
30	2.19	0.22	0.60	0.07	0.16	0.41	0.74	1.00	0.11	5.50	8.49	13.98
35	2.18	0.22	0.64	0.07	0.18	0.41	0.74	1.03	0.11	5.57	8.71	14.28
40	2.17	0.22	0.67	0.07	0.20	0.41	0.74	1.06	0.11	5.65	8.94	14.59
45	2.16	0.23	0.70	0.08	0.22	0.41	0.74	1.09	0.12	5.74	9.18	14.92
50	2.15	0.23	0.74	0.08	0.24	0.41	0.74	1.12	0.12	5.83	9.44	15.26

Table VOC Small Cars 26 Economic Cost of Operation of Small Cars on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.25	0.19	0.38	0.04	0.05	0.00	0.00	0.83	0.09	3.84	10.20	14.05
5	2.23	0.19	0.42	0.04	0.07	0.00	0.00	0.85	0.09	3.90	10.42	14.32
10	2.21	0.20	0.45	0.04	0.09	0.00	0.00	0.87	0.09	3.96	10.65	14.61
15	2.20	0.20	0.49	0.05	0.11	0.00	0.00	0.89	0.10	4.03	10.89	14.91
20	2.18	0.20	0.52	0.05	0.13	0.00	0.00	0.91	0.10	4.09	11.14	15.23
25	2.16	0.20	0.56	0.06	0.14	0.00	0.00	0.93	0.10	4.16	11.40	15.56
30	2.15	0.21	0.59	0.06	0.16	0.00	0.00	0.95	0.10	4.23	11.67	15.90
35	2.14	0.21	0.63	0.07	0.18	0.00	0.00	0.98	0.11	4.30	11.96	16.26
40	2.12	0.21	0.66	0.07	0.20	0.00	0.00	1.00	0.11	4.37	12.26	16.63
45	2.11	0.22	0.69	0.08	0.22	0.00	0.00	1.03	0.11	4.45	12.57	17.03
50	2.10	0.22	0.73	0.08	0.24	0.00	0.00	1.05	0.11	4.53	12.91	17.44

Table VOC Small Cars 27 Economic Cost of Operation of Small Cars on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost		Total Cost	Passenger Cost	Grand Cost
0	2.25	0.21	0.40	0.04	0.05	0.21	0.37	0.86	0.09	4.48	10.58	15.05
5	2.23	0.21	0.43	0.05	0.07	0.21	0.37	0.88	0.10	4.54	10.81	15.35
10	2.21	0.21	0.47	0.05	0.09	0.21	0.37	0.90	0.10	4.61	11.05	15.66
15	2.20	0.21	0.50	0.05	0.11	0.21	0.37	0.92	0.10	4.67	11.31	15.99
20	2.18	0.22	0.54	0.06	0.13	0.21	0.37	0.95	0.10	4.74	11.58	16.32
25	2.17	0.22	0.57	0.06	0.14	0.21	0.37	0.97	0.10	4.81	11.86	16.68
30	2.16	0.22	0.61	0.07	0.16	0.21	0.37	0.99	0.11	4.89	12.16	17.05
35	2.14	0.23	0.64	0.07	0.18	0.21	0.37	1.02	0.11	4.97	12.47	17.43
40	2.13	0.23	0.68	0.08	0.20	0.21	0.37	1.05	0.11	5.04	12.80	17.84
45	2.12	0.23	0.71	0.08	0.22	0.21	0.37	1.07	0.12	5.13	13.14	18.27
50	2.12	0.24	0.74	0.08	0.24	0.21	0.37	1.10	0.12	5.21	13.51	18.72

Table VOC Small Cars 28 Economic Cost of Operation of Small Cars on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.25	0.22	0.42	0.05	0.05	0.41	0.74	0.90	0.10	5.12	10.97	16.10
5	2.23	0.22	0.45	0.05	0.07	0.41	0.74	0.92	0.10	5.19	11.23	16.42
10	2.22	0.23	0.48	0.05	0.09	0.41	0.74	0.94	0.10	5.26	11.49	16.75
15	2.20	0.23	0.52	0.06	0.11	0.41	0.74	0.96	0.10	5.33	11.77	17.10
20	2.19	0.23	0.55	0.06	0.13	0.41	0.74	0.98	0.11	5.40	12.06	17.46
25	2.18	0.24	0.59	0.07	0.14	0.41	0.74	1.01	0.11	5.48	12.37	17.85
30	2.17	0.24	0.62	0.07	0.16	0.41	0.74	1.04	0.11	5.56	12.69	18.25
35	2.16	0.24	0.66	0.08	0.18	0.41	0.74	1.06	0.12	5.64	13.03	18.67
40	2.15	0.25	0.69	0.08	0.20	0.41	0.74	1.09	0.12	5.73	13.39	19.11
45	2.14	0.25	0.73	0.08	0.22	0.41	0.74	1.12	0.12	5.81	13.76	19.58
50	2.14	0.26	0.76	0.09	0.24	0.41	0.74	1.16	0.13	5.91	14.16	20.07

Table VOC Small Cars 29 Economic Cost of Operation of Small Cars on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.29	0.18	0.37	0.03	0.05	0.00	0.00	0.81	0.09	3.83	9.94	13.77
5	2.27	0.19	0.41	0.04	0.07	0.00	0.00	0.83	0.09	3.89	10.15	14.04
10	2.25	0.19	0.44	0.04	0.09	0.00	0.00	0.85	0.09	3.95	10.36	14.31
15	2.23	0.19	0.48	0.05	0.11	0.00	0.00	0.86	0.09	4.01	10.59	14.60
20	2.21	0.19	0.51	0.05	0.13	0.00	0.00	0.88	0.10	4.07	10.82	14.90
25	2.19	0.20	0.55	0.05	0.14	0.00	0.00	0.90	0.10	4.14	11.07	15.21
30	2.18	0.20	0.58	0.06	0.16	0.00	0.00	0.92	0.10	4.20	11.33	15.53
35	2.16	0.20	0.62	0.06	0.18	0.00	0.00	0.95	0.10	4.27	11.60	15.87
40	2.15	0.20	0.65	0.07	0.20	0.00	0.00	0.97	0.11	4.34	11.88	16.22
45	2.14	0.21	0.68	0.07	0.22	0.00	0.00	0.99	0.11	4.42	12.18	16.59
50	2.12	0.21	0.72	0.08	0.24	0.00	0.00	1.02	0.11	4.49	12.49	16.98

Table VOC Small Cars 30 Economic Cost of Operation of Small Cars on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	,	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.28	0.19	0.38	0.04	0.05	0.21	0.37	0.84	0.09	4.46	10.29	14.75
5	2.26	0.19	0.42	0.04	0.07	0.21	0.37	0.86	0.09	4.52	10.51	15.03
10	2.25	0.20	0.45	0.04	0.09	0.21	0.37	0.88	0.09	4.58	10.75	15.32
15	2.23	0.20	0.49	0.05	0.11	0.21	0.37	0.90	0.10	4.64	10.99	15.63
20	2.21	0.20	0.52	0.05	0.13	0.21	0.37	0.92	0.10	4.71	11.24	15.95
25	2.20	0.20	0.56	0.06	0.14	0.21	0.37	0.94	0.10	4.78	11.51	16.28
30	2.18	0.21	0.59	0.06	0.16	0.21	0.37	0.96	0.10	4.85	11.78	16.63
35	2.17	0.21	0.63	0.07	0.18	0.21	0.37	0.99	0.11	4.92	12.08	17.00
40	2.16	0.21	0.66	0.07	0.20	0.21	0.37	1.01	0.11	4.99	12.38	17.38
45	2.15	0.22	0.69	0.08	0.22	0.21	0.37	1.04	0.11	5.07	12.71	17.78
50	2.14	0.22	0.73	0.08	0.24	0.21	0.37	1.07	0.12	5.15	13.05	18.20

Table VOC Small Cars 31 Economic Cost of Operation of Small Cars on Six Lane Divided Expressways (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.20	0.39	0.04	0.05	0.41	0.74	0.87	0.09	5.08	10.67	15.75
5	2.26	0.20	0.43	0.04	0.07	0.41	0.74	0.89	0.10	5.15	10.91	16.05
10	2.25	0.21	0.46	0.05	0.09	0.41	0.74	0.91	0.10	5.21	11.16	16.37
15	2.23	0.21	0.50	0.05	0.11	0.41	0.74	0.93	0.10	5.28	11.42	16.70
20	2.22	0.21	0.53	0.06	0.13	0.41	0.74	0.95	0.10	5.35	11.69	17.04
25	2.20	0.21	0.57	0.06	0.14	0.41	0.74	0.98	0.11	5.42	11.98	17.40
30	2.19	0.22	0.60	0.07	0.16	0.41	0.74	1.00	0.11	5.50	12.28	17.78
35	2.18	0.22	0.64	0.07	0.18	0.41	0.74	1.03	0.11	5.57	12.60	18.17
40	2.17	0.22	0.67	0.07	0.20	0.41	0.74	1.06	0.11	5.65	12.93	18.59
45	2.16	0.23	0.70	0.08	0.22	0.41	0.74	1.09	0.12	5.74	13.29	19.02
50	2.15	0.23	0.74	0.08	0.24	0.41	0.74	1.12	0.12	5.82	13.66	19.48

Table VOC Small Cars 32 Economic Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.18	0.37	0.03	0.05	0.00	0.00	0.79	0.09	3.84	9.69	13.53
5	2.31	0.18	0.40	0.04	0.07	0.00	0.00	0.81	0.09	3.89	9.89	13.78
10	2.28	0.19	0.44	0.04	0.09	0.00	0.00	0.82	0.09	3.95	10.09	14.04
15	2.26	0.19	0.47	0.04	0.11	0.00	0.00	0.84	0.09	4.01	10.30	14.31
20	2.24	0.19	0.51	0.05	0.13	0.00	0.00	0.86	0.09	4.07	10.53	14.59
25	2.23	0.19	0.54	0.05	0.14	0.00	0.00	0.88	0.10	4.13	10.76	14.89
30	2.21	0.19	0.58	0.06	0.16	0.00	0.00	0.90	0.10	4.19	11.00	15.19
35	2.19	0.20	0.61	0.06	0.18	0.00	0.00	0.92	0.10	4.26	11.26	15.51
40	2.18	0.20	0.64	0.07	0.20	0.00	0.00	0.94	0.10	4.33	11.52	15.85
45	2.16	0.20	0.68	0.07	0.22	0.00	0.00	0.96	0.10	4.40	11.80	16.20
50	2.15	0.20	0.71	0.08	0.24	0.00	0.00	0.99	0.11	4.47	12.09	16.56

Table VOC Small Cars 33
Economic Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.19	0.38	0.03	0.05	0.21	0.37	0.82	0.09	4.45	10.02	14.47
5	2.30	0.19	0.41	0.04	0.07	0.21	0.37	0.84	0.09	4.51	10.23	14.74
10	2.28	0.19	0.45	0.04	0.09	0.21	0.37	0.85	0.09	4.57	10.45	15.02
15	2.26	0.19	0.48	0.05	0.11	0.21	0.37	0.87	0.09	4.63	10.68	15.31
20	2.24	0.20	0.51	0.05	0.13	0.21	0.37	0.89	0.10	4.69	10.92	15.61
25	2.23	0.20	0.55	0.06	0.14	0.21	0.37	0.91	0.10	4.76	11.17	15.93
30	2.21	0.20	0.58	0.06	0.16	0.21	0.37	0.93	0.10	4.83	11.43	16.26
35	2.20	0.20	0.62	0.06	0.18	0.21	0.37	0.96	0.10	4.90	11.71	16.60
40	2.18	0.21	0.65	0.07	0.20	0.21	0.37	0.98	0.11	4.97	12.00	16.96
45	2.17	0.21	0.69	0.07	0.22	0.21	0.37	1.00	0.11	5.04	12.30	17.34
50	2.16	0.21	0.72	0.08	0.24	0.21	0.37	1.03	0.11	5.12	12.62	17.74

Table VOC Small Cars 34
Economic Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.19	0.38	0.04	0.05	0.41	0.74	0.85	0.09	5.07	10.38	15.45
5	2.30	0.19	0.42	0.04	0.07	0.41	0.74	0.87	0.09	5.13	10.61	15.73
10	2.28	0.20	0.45	0.04	0.09	0.41	0.74	0.89	0.10	5.19	10.84	16.03
15	2.26	0.20	0.49	0.05	0.11	0.41	0.74	0.91	0.10	5.26	11.09	16.34
20	2.24	0.20	0.52	0.05	0.13	0.41	0.74	0.93	0.10	5.32	11.35	16.67
25	2.23	0.20	0.56	0.06	0.14	0.41	0.74	0.95	0.10	5.39	11.62	17.01
30	2.22	0.21	0.59	0.06	0.16	0.41	0.74	0.97	0.11	5.46	11.90	17.36
35	2.20	0.21	0.63	0.07	0.18	0.41	0.74	1.00	0.11	5.54	12.20	17.74
40	2.19	0.21	0.66	0.07	0.20	0.41	0.74	1.02	0.11	5.62	12.51	18.13
45	2.18	0.22	0.69	0.08	0.22	0.41	0.74	1.05	0.11	5.69	12.84	18.54
50	2.17	0.22	0.73	0.08	0.24	0.41	0.74	1.08	0.12	5.78	13.19	18.97

Table VOC Small Cars 35 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.70	0.33	0.84	0.09	0.11	0.00	0.00	1.18	0.23	7.47	4.82	12.28
5	4.67	0.33	0.91	0.10	0.15	0.00	0.00	1.24	0.24	7.64	5.08	12.72
10	4.65	0.34	0.98	0.11	0.19	0.00	0.00	1.32	0.25	7.83	5.38	13.21
15	4.65	0.34	1.05	0.12	0.23	0.00	0.00	1.40	0.27	8.05	5.71	13.76
20	4.66	0.35	1.12	0.12	0.27	0.00	0.00	1.49	0.29	8.30	6.09	14.39
25	4.69	0.35	1.19	0.13	0.31	0.00	0.00	1.60	0.31	8.58	6.53	15.10
30	4.74	0.36	1.26	0.14	0.35	0.00	0.00	1.72	0.33	8.90	7.02	15.92
35	4.82	0.36	1.33	0.15	0.38	0.00	0.00	1.86	0.36	9.26	7.61	16.87
40	4.92	0.37	1.40	0.16	0.42	0.00	0.00	2.03	0.39	9.69	8.29	17.98
45	5.05	0.37	1.47	0.17	0.46	0.00	0.00	2.23	0.43	10.19	9.11	19.30
50	5.23	0.38	1.55	0.18	0.50	0.00	0.00	2.47	0.47	10.78	10.12	20.90

Table VOC Small Cars 36 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	_	Grand Cost
0	4.76	0.38	0.90	0.11	0.11	0.37	0.66	1.23	0.24	8.74	5.03	13.78
5	4.74	0.38	0.97	0.11	0.15	0.37	0.66	1.30	0.25	8.94	5.33	14.26
10	4.73	0.39	1.04	0.12	0.19	0.37	0.66	1.38	0.26	9.15	5.65	14.81
15	4.74	0.39	1.11	0.13	0.23	0.37	0.66	1.47	0.28	9.39	6.03	15.42
20	4.77	0.40	1.18	0.14	0.27	0.37	0.66	1.58	0.30	9.67	6.45	16.12
25	4.82	0.41	1.25	0.15	0.31	0.37	0.66	1.70	0.32	9.98	6.93	16.92
30	4.89	0.41	1.32	0.16	0.35	0.37	0.66	1.83	0.35	10.34	7.50	17.84
35	4.98	0.42	1.39	0.17	0.38	0.37	0.66	2.00	0.38	10.76	8.17	18.92
40	5.11	0.43	1.46	0.18	0.42	0.37	0.66	2.19	0.42	11.25	8.96	20.21
45	5.28	0.44	1.53	0.18	0.46	0.37	0.66	2.43	0.46	11.83	9.93	21.76
50	5.51	0.45	1.60	0.19	0.50	0.37	0.66	2.72	0.52	12.53	11.14	23.67

Table VOC Small Cars 37 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost		Total Cost	Passenger Cost	Grand Cost
0	4.82	0.44	0.96	0.12	0.11	0.73	1.32	1.29	0.25	10.05	5.27	15.33
5	4.82	0.45	1.03	0.13	0.15	0.73	1.32	1.37	0.26	10.27	5.60	15.86
10	4.83	0.46	1.10	0.14	0.19	0.73	1.32	1.46	0.28	10.51	5.96	16.47
15	4.85	0.47	1.17	0.15	0.23	0.73	1.32	1.56	0.30	10.78	6.37	17.15
20	4.89	0.48	1.24	0.16	0.27	0.73	1.32	1.67	0.32	11.09	6.85	17.93
25	4.96	0.49	1.31	0.17	0.31	0.73	1.32	1.81	0.35	11.44	7.40	18.84
30	5.05	0.50	1.38	0.18	0.35	0.73	1.32	1.97	0.38	11.85	8.05	19.90
35	5.17	0.51	1.45	0.18	0.38	0.73	1.32	2.16	0.41	12.33	8.82	21.15
40	5.34	0.52	1.52	0.19	0.42	0.73	1.32	2.39	0.46	12.89	9.75	22.65
45	5.55	0.53	1.59	0.20	0.46	0.73	1.32	2.67	0.51	13.58	10.91	24.49
50	5.85	0.54	1.66	0.21	0.50	0.73	1.32	3.03	0.58	14.43	12.38	26.81

Table VOC Small Cars 38 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.90	0.54	1.02	0.14	0.11	1.10	1.98	1.35	0.26	11.41	5.54	16.95
5	4.91	0.55	1.09	0.15	0.15	1.10	1.98	1.44	0.28	11.65	5.89	17.54
10	4.93	0.56	1.16	0.16	0.19	1.10	1.98	1.54	0.29	11.92	6.30	18.22
15	4.97	0.58	1.23	0.17	0.23	1.10	1.98	1.65	0.32	12.22	6.76	18.99
20	5.03	0.59	1.30	0.17	0.27	1.10	1.98	1.78	0.34	12.57	7.30	19.87
25	5.12	0.61	1.37	0.18	0.31	1.10	1.98	1.94	0.37	12.98	7.93	20.90
30	5.23	0.62	1.44	0.19	0.35	1.10	1.98	2.12	0.41	13.45	8.68	22.12
35	5.39	0.64	1.51	0.20	0.38	1.10	1.98	2.34	0.45	14.00	9.58	23.58
40	5.60	0.65	1.58	0.21	0.42	1.10	1.98	2.62	0.50	14.67	10.70	25.37
45	5.87	0.67	1.65	0.22	0.46	1.10	1.98	2.96	0.57	15.49	12.11	27.60
50	6.25	0.69	1.72	0.23	0.50	1.10	1.98	3.41	0.65	16.54	13.94	30.49

Table VOC Small Cars 39 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.99	0.69	1.08	0.16	0.11	1.47	2.64	1.43	0.27	12.83	5.83	18.66
5	5.01	0.71	1.15	0.17	0.15	1.47	2.64	1.52	0.29	13.10	6.23	19.33
10	5.04	0.73	1.22	0.17	0.19	1.47	2.64	1.63	0.31	13.41	6.68	20.09
15	5.10	0.75	1.29	0.18	0.23	1.47	2.64	1.76	0.34	13.76	7.20	20.96
20	5.18	0.77	1.36	0.19	0.27	1.47	2.64	1.91	0.37	14.17	7.81	21.98
25	5.29	0.80	1.43	0.20	0.31	1.47	2.64	2.09	0.40	14.63	8.54	23.17
30	5.44	0.83	1.50	0.21	0.35	1.47	2.64	2.30	0.44	15.18	9.42	24.60
35	5.64	0.86	1.57	0.22	0.38	1.47	2.64	2.56	0.49	15.84	10.49	26.33
40	5.91	0.89	1.64	0.23	0.42	1.47	2.64	2.90	0.55	16.65	11.84	28.49
45	6.26	0.92	1.71	0.24	0.46	1.47	2.64	3.32	0.64	17.67	13.59	31.26
50	6.75	0.96	1.78	0.24	0.50	1.47	2.64	3.90	0.75	19.00	15.95	34.96

Table VOC Small Cars 40 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	5.09	0.94	1.14	0.17	0.11	1.84	3.31	1.50	0.29	14.39	6.15	20.54
5	5.12	0.98	1.21	0.18	0.15	1.84	3.31	1.61	0.31	14.71	6.60	21.30
10	5.17	1.02	1.28	0.19	0.19	1.84	3.31	1.74	0.33	15.07	7.11	22.18
15	5.25	1.07	1.35	0.20	0.23	1.84	3.31	1.88	0.36	15.48	7.70	23.19
20	5.36	1.12	1.42	0.21	0.27	1.84	3.31	2.06	0.39	15.96	8.41	24.37
25	5.50	1.17	1.49	0.22	0.31	1.84	3.31	2.26	0.43	16.53	9.25	25.78
30	5.69	1.23	1.56	0.23	0.35	1.84	3.31	2.52	0.48	17.20	10.29	27.49
35	5.94	1.30	1.63	0.23	0.38	1.84	3.31	2.83	0.54	18.01	11.59	29.60
40	6.28	1.37	1.70	0.24	0.42	1.84	3.31	3.24	0.62	19.03	13.26	32.29
45	6.74	1.46	1.77	0.25	0.46	1.84	3.31	3.79	0.73	20.34	15.50	35.84
50	7.41	1.55	1.84	0.26	0.50	1.84	3.31	4.56	0.87	22.14	18.64	40.78

Table VOC Small Cars 41 Financial Cost of Operation of Small Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.20	1.51	1.20	0.19	0.11	2.20	3.97	1.59	0.31	16.28	6.52	22.80
5	5.25	1.62	1.27	0.20	0.15	2.20	3.97	1.72	0.33	16.70	7.01	23.71
10	5.32	1.73	1.34	0.21	0.19	2.20	3.97	1.86	0.36	17.17	7.59	24.77
15	5.42	1.87	1.41	0.22	0.23	2.20	3.97	2.02	0.39	17.72	8.28	26.00
20	5.56	2.02	1.48	0.23	0.27	2.20	3.97	2.22	0.43	18.37	9.10	27.47
25	5.74	2.21	1.55	0.23	0.31	2.20	3.97	2.47	0.47	19.15	10.10	29.25
30	5.98	2.43	1.62	0.24	0.35	2.20	3.97	2.77	0.53	20.09	11.35	31.44
35	6.30	2.70	1.69	0.25	0.38	2.20	3.97	3.17	0.61	21.27	12.94	34.21
40	6.74	3.05	1.76	0.26	0.42	2.20	3.97	3.68	0.71	22.79	15.07	37.85
45	7.36	3.49	1.83	0.27	0.46	2.20	3.97	4.41	0.84	24.83	18.02	42.85
50	8.30	4.08	1.90	0.28	0.50	2.20	3.97	5.48	1.05	27.76	22.42	50.18

Table VOC Small Cars 42 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.83	0.30	0.80	0.08	0.11	0.00	0.00	1.06	0.20	7.39	4.35	11.73
5	4.77	0.31	0.87	0.09	0.15	0.00	0.00	1.12	0.21	7.52	4.58	12.10
10	4.73	0.31	0.94	0.10	0.19	0.00	0.00	1.18	0.23	7.67	4.83	12.50
15	4.70	0.31	1.01	0.10	0.23	0.00	0.00	1.25	0.24	7.85	5.11	12.96
20	4.68	0.32	1.09	0.11	0.27	0.00	0.00	1.33	0.25	8.05	5.43	13.48
25	4.68	0.32	1.16	0.12	0.31	0.00	0.00	1.42	0.27	8.28	5.79	14.07
30	4.70	0.33	1.23	0.13	0.35	0.00	0.00	1.52	0.29	8.54	6.20	14.74
35	4.74	0.33	1.30	0.14	0.38	0.00	0.00	1.63	0.31	8.83	6.68	15.51
40	4.80	0.34	1.37	0.15	0.42	0.00	0.00	1.77	0.34	9.18	7.23	16.41
45	4.88	0.34	1.44	0.16	0.46	0.00	0.00	1.93	0.37	9.58	7.89	17.47
50	5.01	0.35	1.51	0.17	0.50	0.00	0.00	2.12	0.41	10.05	8.67	18.73

Table VOC Small Cars 43 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.88	0.33	0.84	0.09	0.11	0.37	0.66	1.10	0.21	8.59	4.48	13.07
5	4.83	0.33	0.91	0.10	0.15	0.37	0.66	1.16	0.22	8.73	4.73	13.46
10	4.80	0.34	0.98	0.11	0.19	0.37	0.66	1.22	0.23	8.90	5.00	13.90
15	4.78	0.34	1.06	0.12	0.23	0.37	0.66	1.30	0.25	9.09	5.30	14.39
20	4.77	0.35	1.13	0.12	0.27	0.37	0.66	1.38	0.26	9.31	5.65	14.95
25	4.78	0.35	1.20	0.13	0.31	0.37	0.66	1.48	0.28	9.56	6.04	15.59
30	4.81	0.36	1.27	0.14	0.35	0.37	0.66	1.59	0.30	9.84	6.49	16.32
35	4.86	0.36	1.34	0.15	0.38	0.37	0.66	1.71	0.33	10.16	7.01	17.17
40	4.93	0.37	1.41	0.16	0.42	0.37	0.66	1.86	0.36	10.54	7.62	18.16
45	5.04	0.37	1.48	0.17	0.46	0.37	0.66	2.04	0.39	10.99	8.35	19.34
50	5.19	0.38	1.55	0.18	0.50	0.37	0.66	2.26	0.43	11.52	9.23	20.75

Table VOC Small Cars 44 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	4.94	0.36	0.88	0.10	0.11	0.73	1.32	1.13	0.22	9.80	4.63	14.43
5	4.90	0.37	0.95	0.11	0.15	0.73	1.32	1.20	0.23	9.96	4.89	14.85
10	4.87	0.37	1.03	0.12	0.19	0.73	1.32	1.27	0.24	10.14	5.18	15.32
15	4.86	0.38	1.10	0.13	0.23	0.73	1.32	1.35	0.26	10.35	5.51	15.86
20	4.86	0.38	1.17	0.14	0.27	0.73	1.32	1.44	0.28	10.59	5.88	16.46
25	4.88	0.39	1.24	0.15	0.31	0.73	1.32	1.54	0.30	10.86	6.30	17.16
30	4.92	0.40	1.31	0.15	0.35	0.73	1.32	1.66	0.32	11.16	6.79	17.96
35	4.99	0.40	1.38	0.16	0.38	0.73	1.32	1.80	0.34	11.52	7.37	18.89
40	5.08	0.41	1.45	0.17	0.42	0.73	1.32	1.97	0.38	11.94	8.05	19.99
45	5.22	0.42	1.52	0.18	0.46	0.73	1.32	2.17	0.42	12.44	8.87	21.30
50	5.39	0.42	1.59	0.19	0.50	0.73	1.32	2.41	0.46	13.03	9.87	22.90

Table VOC Small Cars 45 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.00	0.40	0.92	0.11	0.11	1.10	1.98	1.17	0.22	11.03	4.78	15.81
5	4.97	0.41	1.00	0.12	0.15	1.10	1.98	1.24	0.24	11.20	5.06	16.27
10	4.95	0.41	1.07	0.13	0.19	1.10	1.98	1.31	0.25	11.40	5.37	16.78
15	4.95	0.42	1.14	0.14	0.23	1.10	1.98	1.40	0.27	11.63	5.73	17.36
20	4.96	0.43	1.21	0.15	0.27	1.10	1.98	1.50	0.29	11.88	6.13	18.01
25	4.99	0.44	1.28	0.16	0.31	1.10	1.98	1.61	0.31	12.18	6.59	18.77
30	5.05	0.45	1.35	0.17	0.35	1.10	1.98	1.74	0.33	12.52	7.13	19.65
35	5.13	0.45	1.42	0.17	0.38	1.10	1.98	1.90	0.36	12.91	7.77	20.68
40	5.25	0.46	1.49	0.18	0.42	1.10	1.98	2.09	0.40	13.38	8.53	21.91
45	5.41	0.47	1.56	0.19	0.46	1.10	1.98	2.31	0.44	13.93	9.46	23.39
50	5.62	0.48	1.63	0.20	0.50	1.10	1.98	2.59	0.50	14.61	10.61	25.22

Table VOC Small Cars 46 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.07	0.45	0.97	0.12	0.11	1.47	2.64	1.21	0.23	12.28	4.95	17.23
5	5.04	0.46	1.04	0.13	0.15	1.47	2.64	1.28	0.25	12.47	5.25	17.71
10	5.04	0.47	1.11	0.14	0.19	1.47	2.64	1.37	0.26	12.68	5.59	18.27
15	5.04	0.48	1.18	0.15	0.23	1.47	2.64	1.46	0.28	12.93	5.97	18.89
20	5.07	0.49	1.25	0.16	0.27	1.47	2.64	1.57	0.30	13.21	6.41	19.61
25	5.11	0.50	1.32	0.17	0.31	1.47	2.64	1.69	0.32	13.53	6.91	20.45
30	5.19	0.51	1.39	0.18	0.35	1.47	2.64	1.84	0.35	13.90	7.51	21.42
35	5.29	0.52	1.46	0.19	0.38	1.47	2.64	2.01	0.38	14.34	8.22	22.56
40	5.43	0.53	1.53	0.19	0.42	1.47	2.64	2.22	0.42	14.86	9.07	23.94
45	5.62	0.54	1.60	0.20	0.46	1.47	2.64	2.48	0.47	15.49	10.13	25.62
50	5.87	0.55	1.67	0.21	0.50	1.47	2.64	2.80	0.54	16.26	11.46	27.72

Table VOC Small Cars 47 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost		_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.14	0.51	1.01	0.14	0.11	1.84	3.31	1.25	0.24	13.54	5.13	18.67
5	5.13	0.52	1.08	0.14	0.15	1.84	3.31	1.33	0.26	13.75	5.45	19.20
10	5.13	0.54	1.15	0.15	0.19	1.84	3.31	1.42	0.27	13.99	5.81	19.80
15	5.14	0.55	1.22	0.16	0.23	1.84	3.31	1.52	0.29	14.26	6.23	20.48
20	5.18	0.56	1.29	0.17	0.27	1.84	3.31	1.64	0.31	14.56	6.71	21.27
25	5.24	0.57	1.36	0.18	0.31	1.84	3.31	1.78	0.34	14.92	7.27	22.19
30	5.33	0.59	1.43	0.19	0.35	1.84	3.31	1.94	0.37	15.33	7.93	23.26
35	5.46	0.60	1.50	0.20	0.38	1.84	3.31	2.13	0.41	15.82	8.72	24.55
40	5.62	0.62	1.57	0.21	0.42	1.84	3.31	2.37	0.45	16.41	9.69	26.10
45	5.85	0.63	1.64	0.21	0.46	1.84	3.31	2.67	0.51	17.12	10.90	28.03
50	6.16	0.65	1.71	0.22	0.50	1.84	3.31	3.05	0.58	18.02	12.46	30.49

Table VOC Small Cars 48 Financial Cost of Operation of Small Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.22	0.60	1.05	0.15	0.11	2.20	3.97	1.30	0.25	14.84	5.32	20.16
5	5.21	0.61	1.12	0.16	0.15	2.20	3.97	1.39	0.27	15.07	5.67	20.73
10	5.22	0.63	1.19	0.16	0.19	2.20	3.97	1.48	0.28	15.33	6.06	21.39
15	5.25	0.64	1.26	0.17	0.23	2.20	3.97	1.59	0.30	15.62	6.51	22.14
20	5.30	0.66	1.33	0.18	0.27	2.20	3.97	1.72	0.33	15.97	7.04	23.00
25	5.38	0.68	1.40	0.19	0.31	2.20	3.97	1.87	0.36	16.36	7.66	24.02
30	5.49	0.70	1.47	0.20	0.35	2.20	3.97	2.05	0.39	16.82	8.40	25.22
35	5.64	0.72	1.54	0.21	0.38	2.20	3.97	2.27	0.43	17.37	9.29	26.66
40	5.84	0.74	1.61	0.22	0.42	2.20	3.97	2.54	0.49	18.04	10.40	28.44
45	6.12	0.77	1.68	0.23	0.46	2.20	3.97	2.89	0.55	18.86	11.81	30.67
50	6.49	0.79	1.75	0.23	0.50	2.20	3.97	3.34	0.64	19.92	13.66	33.58

Table VOC Small Cars 49 Financial Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.02	0.29	0.79	0.07	0.11	0.00	0.00	0.96	0.18	7.42	5.26	12.69
5	4.94	0.30	0.86	0.08	0.15	0.00	0.00	1.01	0.19	7.52	5.53	13.05
10	4.87	0.30	0.93	0.09	0.19	0.00	0.00	1.06	0.20	7.63	5.83	13.47
15	4.81	0.30	1.00	0.10	0.23	0.00	0.00	1.12	0.21	7.77	6.16	13.93
20	4.76	0.31	1.07	0.11	0.27	0.00	0.00	1.19	0.23	7.93	6.54	14.46
25	4.73	0.31	1.14	0.12	0.31	0.00	0.00	1.27	0.24	8.11	6.96	15.06
30	4.71	0.31	1.21	0.13	0.35	0.00	0.00	1.35	0.26	8.32	7.43	15.75
35	4.72	0.32	1.28	0.13	0.38	0.00	0.00	1.45	0.28	8.56	7.98	16.54
40	4.74	0.32	1.35	0.14	0.42	0.00	0.00	1.57	0.30	8.85	8.61	17.46
45	4.79	0.33	1.42	0.15	0.46	0.00	0.00	1.70	0.33	9.18	9.36	18.54
50	4.87	0.33	1.49	0.16	0.50	0.00	0.00	1.86	0.36	9.58	10.24	19.82

Table VOC Small Cars 50 Financial Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

RF			Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.07	0.31	0.82	0.08	0.11	0.37	0.66	0.98	0.19	8.59	5.39	13.98
5	4.99	0.32	0.89	0.09	0.15	0.37	0.66	1.03	0.20	8.69	5.67	14.37
10	4.93	0.32	0.96	0.10	0.19	0.37	0.66	1.09	0.21	8.82	5.99	14.80
15	4.87	0.32	1.03	0.11	0.23	0.37	0.66	1.15	0.22	8.96	6.34	15.30
20	4.83	0.33	1.10	0.12	0.27	0.37	0.66	1.22	0.23	9.13	6.73	15.86
25	4.81	0.33	1.17	0.13	0.31	0.37	0.66	1.31	0.25	9.33	7.18	16.50
30	4.80	0.34	1.24	0.13	0.35	0.37	0.66	1.40	0.27	9.56	7.68	17.24
35	4.82	0.34	1.31	0.14	0.38	0.37	0.66	1.50	0.29	9.82	8.27	18.09
40	4.85	0.35	1.38	0.15	0.42	0.37	0.66	1.63	0.31	10.13	8.96	19.08
45	4.92	0.35	1.45	0.16	0.46	0.37	0.66	1.78	0.34	10.49	9.76	20.25
50	5.01	0.36	1.52	0.17	0.50	0.37	0.66	1.95	0.37	10.92	10.73	21.65

Table VOC Small Cars 51 Financial Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.12	0.33	0.85	0.09	0.11	0.73	1.32	1.00	0.19	9.76	5.52	15.28
5	5.05	0.34	0.92	0.10	0.15	0.73	1.32	1.06	0.20	9.88	5.82	15.69
10	4.99	0.34	0.99	0.11	0.19	0.73	1.32	1.12	0.21	10.01	6.15	16.16
15	4.94	0.35	1.06	0.12	0.23	0.73	1.32	1.19	0.23	10.17	6.52	16.69
20	4.91	0.35	1.13	0.13	0.27	0.73	1.32	1.26	0.24	10.35	6.94	17.29
25	4.89	0.36	1.20	0.14	0.31	0.73	1.32	1.35	0.26	10.56	7.41	17.97
30	4.90	0.36	1.27	0.14	0.35	0.73	1.32	1.45	0.28	10.80	7.96	18.76
35	4.92	0.37	1.34	0.15	0.38	0.73	1.32	1.56	0.30	11.09	8.59	19.67
40	4.97	0.37	1.41	0.16	0.42	0.73	1.32	1.70	0.32	11.42	9.33	20.75
45	5.05	0.38	1.48	0.17	0.46	0.73	1.32	1.86	0.36	11.81	10.20	22.02
50	5.16	0.39	1.55	0.18	0.50	0.73	1.32	2.05	0.39	12.28	11.26	23.55

Table VOC Small Cars 52 Financial Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.18	0.36	0.88	0.10	0.11	1.10	1.98	1.03	0.20	10.94	5.66	16.60
5	5.11	0.36	0.95	0.11	0.15	1.10	1.98	1.09	0.21	11.07	5.97	17.04
10	5.06	0.37	1.02	0.12	0.19	1.10	1.98	1.15	0.22	11.21	6.32	17.53
15	5.02	0.38	1.09	0.13	0.23	1.10	1.98	1.22	0.23	11.38	6.71	18.09
20	4.99	0.38	1.16	0.14	0.27	1.10	1.98	1.30	0.25	11.58	7.16	18.73
25	4.98	0.39	1.23	0.14	0.31	1.10	1.98	1.39	0.27	11.80	7.66	19.47
30	5.00	0.39	1.30	0.15	0.35	1.10	1.98	1.50	0.29	12.07	8.25	20.31
35	5.03	0.40	1.37	0.16	0.38	1.10	1.98	1.62	0.31	12.37	8.92	21.30
40	5.10	0.41	1.44	0.17	0.42	1.10	1.98	1.77	0.34	12.74	9.73	22.46
45	5.19	0.41	1.51	0.18	0.46	1.10	1.98	1.94	0.37	13.16	10.69	23.85
50	5.33	0.42	1.59	0.19	0.50	1.10	1.98	2.16	0.41	13.68	11.86	25.53

Table VOC Small Cars 53 Financial Cost of Operation of Small Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.23	0.39	0.91	0.11	0.11	1.47	2.64	1.06	0.20	12.13	5.81	17.93
5	5.17	0.39	0.98	0.12	0.15	1.47	2.64	1.12	0.21	12.26	6.13	18.40
10	5.13	0.40	1.05	0.13	0.19	1.47	2.64	1.18	0.23	12.42	6.50	18.92
15	5.09	0.41	1.12	0.14	0.23	1.47	2.64	1.26	0.24	12.60	6.92	19.52
20	5.08	0.42	1.19	0.14	0.27	1.47	2.64	1.34	0.26	12.82	7.39	20.21
25	5.08	0.42	1.27	0.15	0.31	1.47	2.64	1.44	0.28	13.06	7.93	20.99
30	5.10	0.43	1.34	0.16	0.35	1.47	2.64	1.56	0.30	13.35	8.56	21.90
35	5.15	0.44	1.41	0.17	0.38	1.47	2.64	1.69	0.32	13.68	9.29	22.97
40	5.23	0.45	1.48	0.18	0.42	1.47	2.64	1.85	0.35	14.07	10.16	24.23
45	5.34	0.45	1.55	0.19	0.46	1.47	2.64	2.04	0.39	14.54	11.22	25.75
50	5.50	0.46	1.62	0.20	0.50	1.47	2.64	2.28	0.44	15.11	12.51	27.62

Table VOC Small Cars 54 Financial Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.43	0.29	0.79	0.07	0.11	0.00	0.00	0.83	0.16	7.68	6.91	14.59
5	5.38	0.30	0.86	0.08	0.15	0.00	0.00	0.84	0.16	7.77	7.06	14.83
10	5.33	0.30	0.93	0.09	0.19	0.00	0.00	0.86	0.17	7.86	7.21	15.08
15	5.28	0.30	1.00	0.10	0.23	0.00	0.00	0.88	0.17	7.96	7.37	15.34
20	5.24	0.31	1.07	0.11	0.27	0.00	0.00	0.90	0.17	8.06	7.54	15.61
25	5.20	0.31	1.14	0.12	0.31	0.00	0.00	0.92	0.18	8.17	7.72	15.89
30	5.16	0.31	1.21	0.13	0.35	0.00	0.00	0.95	0.18	8.28	7.90	16.18
35	5.12	0.32	1.28	0.13	0.38	0.00	0.00	0.97	0.19	8.39	8.10	16.49
40	5.09	0.32	1.35	0.14	0.42	0.00	0.00	0.99	0.19	8.51	8.30	16.81
45	5.06	0.33	1.42	0.15	0.46	0.00	0.00	1.02	0.20	8.64	8.52	17.15
50	5.03	0.33	1.49	0.16	0.50	0.00	0.00	1.05	0.20	8.76	8.74	17.51

Table VOC Small Cars 55 Financial Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.42	0.31	0.82	0.08	0.11	0.37	0.66	0.86	0.16	8.79	7.16	15.95
5	5.37	0.32	0.89	0.09	0.15	0.37	0.66	0.88	0.17	8.88	7.32	16.20
10	5.32	0.32	0.96	0.10	0.19	0.37	0.66	0.90	0.17	8.99	7.49	16.47
15	5.28	0.32	1.03	0.11	0.23	0.37	0.66	0.92	0.18	9.09	7.66	16.75
20	5.24	0.33	1.10	0.12	0.27	0.37	0.66	0.94	0.18	9.20	7.84	17.04
25	5.20	0.33	1.17	0.13	0.31	0.37	0.66	0.96	0.18	9.31	8.03	17.35
30	5.17	0.34	1.24	0.13	0.35	0.37	0.66	0.99	0.19	9.43	8.23	17.66
35	5.14	0.34	1.31	0.14	0.38	0.37	0.66	1.01	0.19	9.55	8.45	18.00
40	5.11	0.35	1.38	0.15	0.42	0.37	0.66	1.04	0.20	9.68	8.67	18.35
45	5.08	0.35	1.45	0.16	0.46	0.37	0.66	1.07	0.20	9.81	8.90	18.71
50	5.06	0.36	1.52	0.17	0.50	0.37	0.66	1.09	0.21	9.95	9.15	19.09

Table VOC Small Cars 56 Financial Cost of Operation of Small Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.41	0.33	0.85	0.09	0.11	0.73	1.32	0.89	0.17	9.91	7.43	17.34
5	5.36	0.34	0.92	0.10	0.15	0.73	1.32	0.91	0.17	10.01	7.60	17.62
10	5.32	0.34	0.99	0.11	0.19	0.73	1.32	0.93	0.18	10.12	7.78	17.90
15	5.28	0.35	1.06	0.12	0.23	0.73	1.32	0.95	0.18	10.23	7.97	18.20
20	5.25	0.35	1.13	0.13	0.27	0.73	1.32	0.98	0.19	10.35	8.17	18.52
25	5.22	0.36	1.20	0.14	0.31	0.73	1.32	1.00	0.19	10.47	8.38	18.85
30	5.19	0.36	1.27	0.14	0.35	0.73	1.32	1.03	0.20	10.60	8.59	19.19
35	5.16	0.37	1.34	0.15	0.38	0.73	1.32	1.06	0.20	10.73	8.82	19.55
40	5.14	0.37	1.41	0.16	0.42	0.73	1.32	1.09	0.21	10.86	9.07	19.93
45	5.12	0.38	1.48	0.17	0.46	0.73	1.32	1.12	0.21	11.00	9.32	20.33
50	5.10	0.39	1.55	0.18	0.50	0.73	1.32	1.15	0.22	11.15	9.59	20.74

Table VOC Small Cars 57 Financial Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	3	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.45	0.28	0.77	0.07	0.11	0.00	0.00	0.82	0.16	7.65	6.87	14.52
5	5.40	0.28	0.84	0.08	0.15	0.00	0.00	0.84	0.16	7.75	7.01	14.76
10	5.35	0.29	0.91	0.08	0.19	0.00	0.00	0.86	0.16	7.84	7.16	15.00
15	5.31	0.29	0.98	0.09	0.23	0.00	0.00	0.88	0.17	7.94	7.32	15.25
20	5.26	0.29	1.05	0.10	0.27	0.00	0.00	0.90	0.17	8.04	7.48	15.52
25	5.22	0.30	1.12	0.11	0.31	0.00	0.00	0.92	0.18	8.14	7.65	15.79
30	5.18	0.30	1.19	0.12	0.35	0.00	0.00	0.94	0.18	8.25	7.83	16.08
35	5.15	0.30	1.26	0.13	0.38	0.00	0.00	0.96	0.18	8.36	8.01	16.38
40	5.11	0.31	1.33	0.14	0.42	0.00	0.00	0.98	0.19	8.48	8.21	16.69
45	5.08	0.31	1.40	0.15	0.46	0.00	0.00	1.01	0.19	8.60	8.41	17.01
50	5.05	0.32	1.47	0.15	0.50	0.00	0.00	1.03	0.20	8.73	8.63	17.36

Table VOC Small Cars 58 Financial Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.44	0.29	0.79	0.07	0.11	0.37	0.66	0.85	0.16	8.74	7.11	15.85
5	5.39	0.30	0.86	0.08	0.15	0.37	0.66	0.87	0.17	8.84	7.26	16.10
10	5.35	0.30	0.93	0.09	0.19	0.37	0.66	0.89	0.17	8.94	7.42	16.36
15	5.30	0.30	1.00	0.10	0.23	0.37	0.66	0.91	0.17	9.04	7.59	16.63
20	5.26	0.31	1.07	0.11	0.27	0.37	0.66	0.93	0.18	9.15	7.77	16.92
25	5.23	0.31	1.14	0.12	0.31	0.37	0.66	0.95	0.18	9.26	7.95	17.21
30	5.19	0.31	1.21	0.13	0.35	0.37	0.66	0.97	0.19	9.38	8.14	17.52
35	5.16	0.32	1.28	0.13	0.38	0.37	0.66	1.00	0.19	9.50	8.34	17.84
40	5.13	0.32	1.35	0.14	0.42	0.37	0.66	1.02	0.20	9.62	8.56	18.18
45	5.11	0.33	1.42	0.15	0.46	0.37	0.66	1.05	0.20	9.75	8.78	18.53
50	5.08	0.33	1.49	0.16	0.50	0.37	0.66	1.08	0.21	9.88	9.01	18.90

Table VOC Small Cars 59 Financial Cost of Operation of Small Cars on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.43	0.30	0.81	0.08	0.11	0.73	1.32	0.88	0.17	9.84	7.37	17.21
5	5.39	0.31	0.88	0.09	0.15	0.73	1.32	0.90	0.17	9.94	7.54	17.48
10	5.35	0.31	0.95	0.10	0.19	0.73	1.32	0.92	0.18	10.05	7.71	17.76
15	5.31	0.32	1.02	0.11	0.23	0.73	1.32	0.94	0.18	10.16	7.89	18.05
20	5.27	0.32	1.09	0.11	0.27	0.73	1.32	0.97	0.19	10.27	8.08	18.35
25	5.24	0.32	1.16	0.12	0.31	0.73	1.32	0.99	0.19	10.39	8.28	18.67
30	5.21	0.33	1.23	0.13	0.35	0.73	1.32	1.02	0.19	10.51	8.49	19.00
35	5.18	0.33	1.30	0.14	0.38	0.73	1.32	1.04	0.20	10.64	8.71	19.35
40	5.16	0.34	1.37	0.15	0.42	0.73	1.32	1.07	0.20	10.77	8.94	19.71
45	5.14	0.34	1.44	0.16	0.46	0.73	1.32	1.10	0.21	10.91	9.18	20.09
50	5.12	0.35	1.51	0.17	0.50	0.73	1.32	1.13	0.22	11.05	9.44	20.49

Table VOC Small Cars 60 Financial Cost of Operation of Small Cars on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.37	0.29	0.79	0.07	0.11	0.00	0.00	0.84	0.16	7.63	10.20	17.84
5	5.32	0.30	0.86	0.08	0.15	0.00	0.00	0.86	0.16	7.73	10.42	18.15
10	5.27	0.30	0.93	0.09	0.19	0.00	0.00	0.88	0.17	7.83	10.65	18.48
15	5.23	0.30	1.00	0.10	0.23	0.00	0.00	0.90	0.17	7.93	10.89	18.82
20	5.19	0.31	1.07	0.11	0.27	0.00	0.00	0.92	0.18	8.03	11.14	19.17
25	5.15	0.31	1.14	0.12	0.31	0.00	0.00	0.94	0.18	8.14	11.40	19.54
30	5.11	0.31	1.21	0.13	0.35	0.00	0.00	0.97	0.18	8.26	11.67	19.93
35	5.08	0.32	1.28	0.13	0.38	0.00	0.00	0.99	0.19	8.38	11.96	20.33
40	5.05	0.32	1.35	0.14	0.42	0.00	0.00	1.01	0.19	8.50	12.26	20.76
45	5.02	0.33	1.42	0.15	0.46	0.00	0.00	1.04	0.20	8.63	12.57	21.20
50	5.00	0.33	1.49	0.16	0.50	0.00	0.00	1.07	0.20	8.76	12.91	21.66

Table VOC Small Cars 61
Financial Cost of Operation of Small Cars on Four Lane Divided Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.36	0.31	0.82	0.08	0.11	0.37	0.66	0.87	0.17	8.75	10.58	19.32
5	5.31	0.32	0.89	0.09	0.15	0.37	0.66	0.89	0.17	8.85	10.81	19.66
10	5.27	0.32	0.96	0.10	0.19	0.37	0.66	0.91	0.17	8.95	11.05	20.01
15	5.23	0.32	1.03	0.11	0.23	0.37	0.66	0.94	0.18	9.06	11.31	20.37
20	5.19	0.33	1.10	0.12	0.27	0.37	0.66	0.96	0.18	9.18	11.58	20.76
25	5.16	0.33	1.17	0.13	0.31	0.37	0.66	0.98	0.19	9.29	11.86	21.16
30	5.13	0.34	1.24	0.13	0.35	0.37	0.66	1.01	0.19	9.41	12.16	21.57
35	5.10	0.34	1.31	0.14	0.38	0.37	0.66	1.03	0.20	9.54	12.47	22.01
40	5.08	0.35	1.38	0.15	0.42	0.37	0.66	1.06	0.20	9.67	12.80	22.47
45	5.06	0.35	1.45	0.16	0.46	0.37	0.66	1.09	0.21	9.81	13.14	22.95

Table VOC Small Cars 62
Financial Cost of Operation of Small Cars on Four Lane Divided Expressways Roads (Rs/km)

0.66

1.12

0.21

23.45

9.95

13.51

Roughness = 4000

50 5.04 0.36

1.52

0.17

0.50

0.37

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.35	0.33	0.85	0.09	0.11	0.73	1.32	0.91	0.17	9.88	10.97	20.85
5	5.31	0.34	0.92	0.10	0.15	0.73	1.32	0.93	0.18	9.98	11.23	21.21
10	5.28	0.34	0.99	0.11	0.19	0.73	1.32	0.95	0.18	10.10	11.49	21.59
15	5.24	0.35	1.06	0.12	0.23	0.73	1.32	0.97	0.19	10.21	11.77	21.98
20	5.21	0.35	1.13	0.13	0.27	0.73	1.32	1.00	0.19	10.33	12.06	22.39
25	5.18	0.36	1.20	0.14	0.31	0.73	1.32	1.02	0.20	10.46	12.37	22.82
30	5.15	0.36	1.27	0.14	0.35	0.73	1.32	1.05	0.20	10.59	12.69	23.27
35	5.13	0.37	1.34	0.15	0.38	0.73	1.32	1.08	0.21	10.72	13.03	23.75
40	5.11	0.37	1.41	0.16	0.42	0.73	1.32	1.11	0.21	10.86	13.39	24.25
45	5.09	0.38	1.48	0.17	0.46	0.73	1.32	1.14	0.22	11.00	13.76	24.77
50	5.08	0.39	1.55	0.18	0.50	0.73	1.32	1.17	0.22	11.16	14.16	25.32

Table VOC Small Cars 63
Financial Cost of Operation of Small Cars on Six Lane Divided Expressways Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.45	0.28	0.77	0.07	0.11	0.00	0.00	0.82	0.16	7.65	9.94	17.59
5	5.40	0.28	0.84	0.08	0.15	0.00	0.00	0.84	0.16	7.75	10.15	17.89
10	5.35	0.29	0.91	0.08	0.19	0.00	0.00	0.86	0.16	7.84	10.36	18.20
15	5.31	0.29	0.98	0.09	0.23	0.00	0.00	0.88	0.17	7.94	10.59	18.52
20	5.26	0.29	1.05	0.10	0.27	0.00	0.00	0.89	0.17	8.04	10.82	18.86
25	5.22	0.30	1.12	0.11	0.31	0.00	0.00	0.92	0.18	8.14	11.07	19.21
30	5.18	0.30	1.19	0.12	0.35	0.00	0.00	0.94	0.18	8.25	11.33	19.58
35	5.15	0.30	1.26	0.13	0.38	0.00	0.00	0.96	0.18	8.36	11.60	19.96
40	5.11	0.31	1.33	0.14	0.42	0.00	0.00	0.98	0.19	8.48	11.88	20.36
45	5.08	0.31	1.40	0.15	0.46	0.00	0.00	1.01	0.19	8.60	12.18	20.78
50	5.05	0.32	1.47	0.15	0.50	0.00	0.00	1.03	0.20	8.73	12.49	21.21

Table VOC Small Cars 64
Financial Cost of Operation of Small Cars on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.44	0.29	0.79	0.07	0.11	0.37	0.66	0.85	0.16	8.74	10.29	19.03
5	5.39	0.30	0.86	0.08	0.15	0.37	0.66	0.87	0.17	8.84	10.51	19.35
10	5.35	0.30	0.93	0.09	0.19	0.37	0.66	0.89	0.17	8.94	10.75	19.68
15	5.30	0.30	1.00	0.10	0.23	0.37	0.66	0.91	0.17	9.04	10.99	20.03
20	5.26	0.31	1.07	0.11	0.27	0.37	0.66	0.93	0.18	9.15	11.24	20.39
25	5.23	0.31	1.14	0.12	0.31	0.37	0.66	0.95	0.18	9.26	11.51	20.77
30	5.19	0.31	1.21	0.13	0.35	0.37	0.66	0.97	0.19	9.38	11.78	21.16
35	5.16	0.32	1.28	0.13	0.38	0.37	0.66	1.00	0.19	9.50	12.08	21.57
40	5.13	0.32	1.35	0.14	0.42	0.37	0.66	1.02	0.20	9.62	12.38	22.00
45	5.11	0.33	1.42	0.15	0.46	0.37	0.66	1.05	0.20	9.75	12.71	22.46
50	5.08	0.33	1.49	0.16	0.50	0.37	0.66	1.08	0.21	9.88	13.05	22.93

Table VOC Small Cars 65
Financial Cost of Operation of Small Cars on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.43	0.30	0.81	0.08	0.11	0.73	1.32	0.88	0.17	9.84	10.67	20.51
5	5.39	0.31	0.88	0.09	0.15	0.73	1.32	0.90	0.17	9.94	10.91	20.85
10	5.35	0.31	0.95	0.10	0.19	0.73	1.32	0.92	0.18	10.05	11.16	21.21
15	5.31	0.32	1.02	0.11	0.23	0.73	1.32	0.94	0.18	10.16	11.42	21.58
20	5.27	0.32	1.09	0.11	0.27	0.73	1.32	0.97	0.19	10.27	11.69	21.97
25	5.24	0.32	1.16	0.12	0.31	0.73	1.32	0.99	0.19	10.39	11.98	22.37
30	5.21	0.33	1.23	0.13	0.35	0.73	1.32	1.02	0.19	10.51	12.28	22.80
35	5.18	0.33	1.30	0.14	0.38	0.73	1.32	1.04	0.20	10.64	12.60	23.24
40	5.16	0.34	1.37	0.15	0.42	0.73	1.32	1.07	0.20	10.77	12.93	23.71
45	5.14	0.34	1.44	0.16	0.46	0.73	1.32	1.10	0.21	10.91	13.29	24.20
50	5.12	0.35	1.51	0.17	0.50	0.73	1.32	1.13	0.22	11.05	13.66	24.71

Table VOC Small Cars 66
Financial Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 2000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.54	0.27	0.75	0.06	0.11	0.00	0.00	0.80	0.15	7.70	9.69	17.39
5	5.49	0.28	0.83	0.07	0.15	0.00	0.00	0.82	0.16	7.79	9.89	17.67
10	5.44	0.28	0.90	0.08	0.19	0.00	0.00	0.83	0.16	7.88	10.09	17.97
15	5.39	0.28	0.97	0.09	0.23	0.00	0.00	0.85	0.16	7.97	10.30	18.28
20	5.34	0.29	1.04	0.10	0.27	0.00	0.00	0.87	0.17	8.07	10.53	18.59
25	5.30	0.29	1.11	0.11	0.31	0.00	0.00	0.89	0.17	8.17	10.76	18.93
30	5.26	0.29	1.18	0.12	0.35	0.00	0.00	0.91	0.17	8.27	11.00	19.27
35	5.22	0.30	1.25	0.13	0.38	0.00	0.00	0.93	0.18	8.38	11.26	19.64
40	5.18	0.30	1.32	0.13	0.42	0.00	0.00	0.95	0.18	8.49	11.52	20.01
45	5.14	0.31	1.39	0.14	0.46	0.00	0.00	0.98	0.19	8.61	11.80	20.41
50	5.11	0.31	1.46	0.15	0.50	0.00	0.00	1.00	0.19	8.73	12.09	20.82

Table VOC Small Cars 67
Financial Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.52	0.28	0.77	0.07	0.11	0.37	0.66	0.83	0.16	8.77	10.02	18.79
5	5.47	0.29	0.84	0.08	0.15	0.37	0.66	0.85	0.16	8.86	10.23	19.10
10	5.43	0.29	0.91	0.09	0.19	0.37	0.66	0.86	0.17	8.96	10.45	19.41
15	5.38	0.29	0.98	0.10	0.23	0.37	0.66	0.88	0.17	9.06	10.68	19.74
20	5.34	0.30	1.05	0.10	0.27	0.37	0.66	0.90	0.17	9.16	10.92	20.08
25	5.30	0.30	1.12	0.11	0.31	0.37	0.66	0.92	0.18	9.27	11.17	20.44
30	5.26	0.30	1.19	0.12	0.35	0.37	0.66	0.95	0.18	9.38	11.43	20.81
35	5.22	0.31	1.26	0.13	0.38	0.37	0.66	0.97	0.19	9.49	11.71	21.20
40	5.19	0.31	1.33	0.14	0.42	0.37	0.66	0.99	0.19	9.61	12.00	21.61
45	5.16	0.32	1.40	0.15	0.46	0.37	0.66	1.02	0.19	9.73	12.30	22.03
50	5.14	0.32	1.47	0.16	0.50	0.37	0.66	1.04	0.20	9.86	12.62	22.48

Table VOC Small Cars 68
Financial Cost of Operation of Small Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.51	0.29	0.79	0.07	0.11	0.73	1.32	0.86	0.16	9.85	10.38	20.23
5	5.46	0.30	0.86	0.08	0.15	0.73	1.32	0.88	0.17	9.95	10.61	20.56
10	5.42	0.30	0.93	0.09	0.19	0.73	1.32	0.90	0.17	10.05	10.84	20.89
15	5.38	0.30	1.00	0.10	0.23	0.73	1.32	0.92	0.18	10.16	11.09	21.24
20	5.34	0.31	1.07	0.11	0.27	0.73	1.32	0.94	0.18	10.27	11.35	21.61
25	5.31	0.31	1.14	0.12	0.31	0.73	1.32	0.96	0.18	10.38	11.62	22.00
30	5.27	0.31	1.21	0.13	0.35	0.73	1.32	0.98	0.19	10.50	11.90	22.40
35	5.24	0.32	1.28	0.13	0.38	0.73	1.32	1.01	0.19	10.62	12.20	22.82
40	5.21	0.32	1.35	0.14	0.42	0.73	1.32	1.03	0.20	10.74	12.51	23.25
45	5.19	0.33	1.42	0.15	0.46	0.73	1.32	1.06	0.20	10.87	12.84	23.72
50	5.17	0.33	1.49	0.16	0.50	0.73	1.32	1.09	0.21	11.01	13.19	24.20

Table VOC Big Cars 1 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.02	0.22	0.41	0.04	0.05	0.00	0.00	1.14	0.12	4.01	4.74	8.75
5	1.99	0.22	0.45	0.05	0.07	0.00	0.00	1.20	0.13	4.11	5.00	9.11
10	1.97	0.22	0.48	0.05	0.09	0.00	0.00	1.27	0.14	4.22	5.30	9.52
15	1.95	0.22	0.51	0.06	0.11	0.00	0.00	1.35	0.15	4.35	5.62	9.98
20	1.94	0.23	0.55	0.06	0.13	0.00	0.00	1.44	0.16	4.50	5.99	10.50
25	1.94	0.23	0.58	0.07	0.14	0.00	0.00	1.54	0.17	4.67	6.41	11.09
30	1.94	0.23	0.62	0.07	0.16	0.00	0.00	1.66	0.18	4.87	6.90	11.77
35	1.96	0.24	0.65	0.07	0.18	0.00	0.00	1.80	0.19	5.09	7.47	12.56
40	1.98	0.24	0.69	0.08	0.20	0.00	0.00	1.96	0.21	5.36	8.13	13.49
45	2.02	0.25	0.72	0.08	0.22	0.00	0.00	2.15	0.23	5.67	8.93	14.60
50	2.08	0.25	0.76	0.09	0.24	0.00	0.00	2.38	0.26	6.05	9.90	15.95

Table VOC Big Cars 2 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.06	0.25	0.44	0.05	0.05	0.25	0.45	1.19	0.13	4.88	4.96	9.84
5	2.03	0.25	0.47	0.06	0.07	0.25	0.45	1.26	0.14	4.99	5.25	10.24
10	2.01	0.26	0.51	0.06	0.09	0.25	0.45	1.34	0.15	5.12	5.57	10.69
15	2.00	0.26	0.54	0.07	0.11	0.25	0.45	1.43	0.15	5.26	5.93	11.20
20	2.00	0.26	0.58	0.07	0.13	0.25	0.45	1.53	0.17	5.43	6.35	11.78
25	2.00	0.27	0.61	0.07	0.14	0.25	0.45	1.64	0.18	5.62	6.82	12.44
30	2.01	0.27	0.65	0.08	0.16	0.25	0.45	1.77	0.19	5.85	7.37	13.22
35	2.04	0.28	0.68	0.08	0.18	0.25	0.45	1.93	0.21	6.10	8.02	14.13
40	2.08	0.28	0.72	0.09	0.20	0.25	0.45	2.12	0.23	6.41	8.80	15.21
45	2.13	0.29	0.75	0.09	0.22	0.25	0.45	2.34	0.25	6.78	9.74	16.52
50	2.21	0.29	0.78	0.10	0.24	0.25	0.45	2.62	0.28	7.23	10.90	18.14

Table VOC Big Cars 3 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.10	0.29	0.47	0.06	0.05	0.50	0.90	1.25	0.14	5.76	5.20	10.97
5	2.08	0.30	0.50	0.07	0.07	0.50	0.90	1.33	0.14	5.89	5.52	11.41
10	2.06	0.30	0.54	0.07	0.09	0.50	0.90	1.41	0.15	6.04	5.87	11.91
15	2.06	0.31	0.57	0.07	0.11	0.50	0.90	1.51	0.16	6.20	6.28	12.48
20	2.06	0.32	0.61	0.08	0.13	0.50	0.90	1.62	0.18	6.39	6.74	13.14
25	2.07	0.32	0.64	0.08	0.14	0.50	0.90	1.75	0.19	6.61	7.28	13.89
30	2.09	0.33	0.68	0.09	0.16	0.50	0.90	1.90	0.21	6.87	7.92	14.78
35	2.13	0.34	0.71	0.09	0.18	0.50	0.90	2.09	0.23	7.17	8.67	15.84
40	2.18	0.34	0.74	0.10	0.20	0.50	0.90	2.31	0.25	7.53	9.58	17.11
45	2.26	0.35	0.78	0.10	0.22	0.50	0.90	2.58	0.28	7.97	10.71	18.67
50	2.36	0.36	0.81	0.10	0.24	0.50	0.90	2.92	0.32	8.52	12.13	20.65

Table VOC Big Cars 4 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.14	0.35	0.50	0.07	0.05	0.75	1.36	1.32	0.14	6.68	5.47	12.15
5	2.13	0.36	0.53	0.07	0.07	0.75	1.36	1.40	0.15	6.83	5.82	12.64
10	2.12	0.37	0.57	0.08	0.09	0.75	1.36	1.49	0.16	6.99	6.21	13.20
15	2.12	0.38	0.60	0.08	0.11	0.75	1.36	1.60	0.17	7.18	6.67	13.85
20	2.13	0.39	0.64	0.09	0.13	0.75	1.36	1.73	0.19	7.40	7.19	14.59
25	2.15	0.40	0.67	0.09	0.14	0.75	1.36	1.88	0.20	7.65	7.81	15.46
30	2.18	0.41	0.70	0.10	0.16	0.75	1.36	2.06	0.22	7.94	8.54	16.49
35	2.23	0.42	0.74	0.10	0.18	0.75	1.36	2.27	0.25	8.30	9.43	17.73
40	2.30	0.43	0.77	0.10	0.20	0.75	1.36	2.53	0.27	8.73	10.52	19.25
45	2.40	0.44	0.81	0.11	0.22	0.75	1.36	2.86	0.31	9.26	11.89	21.16
50	2.54	0.46	0.84	0.11	0.24	0.75	1.36	3.29	0.36	9.95	13.68	23.63

Table VOC Big Cars 5 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.19	0.45	0.53	0.08	0.05	1.01	1.81	1.39	0.15	7.65	5.76	13.41
5	2.18	0.47	0.56	0.08	0.07	1.01	1.81	1.48	0.16	7.81	6.15	13.96
10	2.18	0.48	0.60	0.09	0.09	1.01	1.81	1.59	0.17	8.00	6.59	14.60
15	2.19	0.49	0.63	0.09	0.11	1.01	1.81	1.71	0.19	8.22	7.11	15.33
20	2.21	0.51	0.66	0.09	0.13	1.01	1.81	1.85	0.20	8.47	7.71	16.18
25	2.24	0.53	0.70	0.10	0.14	1.01	1.81	2.03	0.22	8.77	8.42	17.19
30	2.28	0.54	0.73	0.10	0.16	1.01	1.81	2.23	0.24	9.12	9.28	18.40
35	2.35	0.56	0.77	0.11	0.18	1.01	1.81	2.49	0.27	9.54	10.33	19.88
40	2.45	0.58	0.80	0.11	0.20	1.01	1.81	2.80	0.30	10.07	11.66	21.73
45	2.58	0.61	0.84	0.12	0.22	1.01	1.81	3.22	0.35	10.74	13.37	24.11
50	2.77	0.63	0.87	0.12	0.24	1.01	1.81	3.77	0.41	11.62	15.67	27.29

Table VOC Big Cars 6 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.24	0.62	0.56	0.09	0.05	1.26	2.26	1.46	0.16	8.70	6.09	14.78
5	2.24	0.65	0.59	0.09	0.07	1.26	2.26	1.57	0.17	8.90	6.52	15.42
10	2.25	0.68	0.63	0.09	0.09	1.26	2.26	1.69	0.18	9.12	7.02	16.15
15	2.26	0.71	0.66	0.10	0.11	1.26	2.26	1.83	0.20	9.38	7.61	16.99
20	2.29	0.74	0.69	0.10	0.13	1.26	2.26	2.00	0.22	9.69	8.31	17.99
25	2.34	0.77	0.73	0.11	0.14	1.26	2.26	2.20	0.24	10.05	9.14	19.18
30	2.40	0.81	0.76	0.11	0.16	1.26	2.26	2.44	0.26	10.48	10.16	20.64
35	2.49	0.86	0.80	0.12	0.18	1.26	2.26	2.75	0.30	11.01	11.43	22.44
40	2.62	0.91	0.83	0.12	0.20	1.26	2.26	3.15	0.34	11.68	13.07	24.75
45	2.80	0.96	0.87	0.12	0.22	1.26	2.26	3.67	0.40	12.55	15.27	27.82
50	3.06	1.02	0.90	0.13	0.24	1.26	2.26	4.41	0.48	13.76	18.34	32.10

Table VOC Big Cars 7 Economic Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.30	1.00	0.59	0.09	0.05	1.51	2.71	1.55	0.17	9.97	6.45	16.42
5	2.31	1.07	0.62	0.10	0.07	1.51	2.71	1.67	0.18	10.23	6.94	17.17
10	2.32	1.14	0.65	0.10	0.09	1.51	2.71	1.81	0.20	10.53	7.51	18.05
15	2.35	1.23	0.69	0.11	0.11	1.51	2.71	1.97	0.21	10.89	8.19	19.08
20	2.39	1.33	0.72	0.11	0.13	1.51	2.71	2.17	0.23	11.31	9.00	20.31
25	2.45	1.46	0.76	0.12	0.14	1.51	2.71	2.40	0.26	11.81	9.99	21.80
30	2.54	1.60	0.79	0.12	0.16	1.51	2.71	2.70	0.29	12.43	11.22	23.64
35	2.65	1.78	0.83	0.12	0.18	1.51	2.71	3.08	0.33	13.20	12.79	26.00
40	2.82	2.01	0.86	0.13	0.20	1.51	2.71	3.58	0.39	14.21	14.88	29.10
45	3.07	2.30	0.89	0.13	0.22	1.51	2.71	4.28	0.46	15.58	17.79	33.37
50	3.45	2.69	0.93	0.14	0.24	1.51	2.71	5.32	0.58	17.56	22.11	39.67

Table VOC Big Cars 8 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.07	0.20	0.39	0.04	0.05	0.00	0.00	1.04	0.11	3.90	4.31	8.21
5	2.03	0.20	0.43	0.04	0.07	0.00	0.00	1.09	0.12	3.98	4.53	8.52
10	2.00	0.20	0.46	0.05	0.09	0.00	0.00	1.15	0.12	4.08	4.79	8.86
15	1.97	0.21	0.50	0.05	0.11	0.00	0.00	1.22	0.13	4.18	5.07	9.25
20	1.95	0.21	0.53	0.06	0.13	0.00	0.00	1.29	0.14	4.31	5.38	9.69
25	1.93	0.21	0.57	0.06	0.14	0.00	0.00	1.38	0.15	4.44	5.74	10.18
30	1.92	0.22	0.60	0.06	0.16	0.00	0.00	1.48	0.16	4.61	6.15	10.75
35	1.92	0.22	0.63	0.07	0.18	0.00	0.00	1.59	0.17	4.79	6.62	11.41
40	1.93	0.22	0.67	0.07	0.20	0.00	0.00	1.72	0.19	5.01	7.17	12.18
45	1.96	0.22	0.70	0.08	0.22	0.00	0.00	1.88	0.20	5.26	7.82	13.08
50	1.99	0.23	0.74	0.08	0.24	0.00	0.00	2.07	0.22	5.57	8.60	14.16

Table VOC Big Cars 9 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.10	0.22	0.41	0.04	0.05	0.25	0.45	1.07	0.12	4.72	4.44	9.16
5	2.07	0.22	0.45	0.05	0.07	0.25	0.45	1.13	0.12	4.81	4.68	9.49
10	2.04	0.22	0.48	0.05	0.09	0.25	0.45	1.19	0.13	4.91	4.95	9.86
15	2.01	0.23	0.52	0.06	0.11	0.25	0.45	1.26	0.14	5.03	5.25	10.28
20	2.00	0.23	0.55	0.06	0.13	0.25	0.45	1.35	0.15	5.16	5.59	10.75
25	1.99	0.23	0.58	0.07	0.14	0.25	0.45	1.44	0.16	5.31	5.98	11.29
30	1.98	0.24	0.62	0.07	0.16	0.25	0.45	1.55	0.17	5.49	6.43	11.92
35	1.99	0.24	0.65	0.07	0.18	0.25	0.45	1.67	0.18	5.69	6.94	12.64
40	2.00	0.24	0.69	0.08	0.20	0.25	0.45	1.82	0.20	5.93	7.55	13.48
45	2.03	0.25	0.72	0.08	0.22	0.25	0.45	1.99	0.22	6.22	8.28	14.49
50	2.08	0.25	0.76	0.09	0.24	0.25	0.45	2.20	0.24	6.56	9.15	15.71

Table VOC Big Cars 10 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.14	0.24	0.43	0.05	0.05	0.50	0.90	1.10	0.12	5.54	4.59	10.13
5	2.11	0.24	0.47	0.05	0.07	0.50	0.90	1.17	0.13	5.64	4.85	10.49
10	2.08	0.25	0.50	0.06	0.09	0.50	0.90	1.24	0.13	5.75	5.13	10.88
15	2.06	0.25	0.54	0.06	0.11	0.50	0.90	1.31	0.14	5.88	5.46	11.34
20	2.05	0.25	0.57	0.07	0.13	0.50	0.90	1.40	0.15	6.02	5.83	11.85
25	2.04	0.26	0.60	0.07	0.14	0.50	0.90	1.50	0.16	6.19	6.25	12.44
30	2.04	0.26	0.64	0.08	0.16	0.50	0.90	1.62	0.18	6.38	6.73	13.12
35	2.05	0.27	0.67	0.08	0.18	0.50	0.90	1.76	0.19	6.61	7.30	13.91
40	2.08	0.27	0.71	0.08	0.20	0.50	0.90	1.92	0.21	6.88	7.98	14.85
45	2.12	0.28	0.74	0.09	0.22	0.50	0.90	2.11	0.23	7.20	8.79	15.99
50	2.18	0.28	0.78	0.09	0.24	0.50	0.90	2.35	0.25	7.58	9.79	17.37

Table VOC Big Cars 11 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.18	0.26	0.45	0.06	0.05	0.75	1.36	1.14	0.12	6.38	4.74	11.12
5	2.15	0.27	0.49	0.06	0.07	0.75	1.36	1.21	0.13	6.48	5.02	11.50
10	2.13	0.27	0.52	0.06	0.09	0.75	1.36	1.28	0.14	6.61	5.33	11.93
15	2.11	0.28	0.56	0.07	0.11	0.75	1.36	1.37	0.15	6.74	5.68	12.42
20	2.10	0.28	0.59	0.07	0.13	0.75	1.36	1.46	0.16	6.90	6.08	12.98
25	2.10	0.29	0.62	0.08	0.14	0.75	1.36	1.57	0.17	7.09	6.54	13.62
30	2.11	0.29	0.66	0.08	0.16	0.75	1.36	1.70	0.18	7.30	7.07	14.37
35	2.13	0.30	0.69	0.09	0.18	0.75	1.36	1.85	0.20	7.55	7.70	15.25
40	2.16	0.30	0.73	0.09	0.20	0.75	1.36	2.03	0.22	7.85	8.46	16.30
45	2.21	0.31	0.76	0.09	0.22	0.75	1.36	2.26	0.24	8.21	9.37	17.58
50	2.29	0.32	0.80	0.10	0.24	0.75	1.36	2.53	0.27	8.65	10.51	19.16

Table VOC Big Cars 12 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.22	0.30	0.47	0.06	0.05	1.01	1.81	1.18	0.13	7.22	4.91	12.13
5	2.19	0.30	0.51	0.07	0.07	1.01	1.81	1.25	0.14	7.34	5.20	12.54
10	2.17	0.31	0.54	0.07	0.09	1.01	1.81	1.33	0.14	7.47	5.54	13.01
15	2.16	0.31	0.58	0.07	0.11	1.01	1.81	1.42	0.15	7.62	5.91	13.54
20	2.16	0.32	0.61	0.08	0.13	1.01	1.81	1.53	0.17	7.80	6.35	14.15
25	2.16	0.33	0.64	0.08	0.14	1.01	1.81	1.65	0.18	8.00	6.85	14.85
30	2.18	0.33	0.68	0.09	0.16	1.01	1.81	1.79	0.19	8.24	7.44	15.68
35	2.20	0.34	0.71	0.09	0.18	1.01	1.81	1.96	0.21	8.52	8.15	16.66
40	2.25	0.35	0.75	0.10	0.20	1.01	1.81	2.16	0.23	8.85	8.99	17.85
45	2.31	0.36	0.78	0.10	0.22	1.01	1.81	2.42	0.26	9.26	10.04	19.30
50	2.41	0.36	0.82	0.10	0.24	1.01	1.81	2.73	0.30	9.77	11.36	21.13

Table VOC Big Cars 13 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.26	0.34	0.49	0.07	0.05	1.26	2.26	1.22	0.13	8.08	5.08	13.17
5	2.24	0.35	0.53	0.07	0.07	1.26	2.26	1.30	0.14	8.21	5.40	13.61
10	2.22	0.35	0.56	0.08	0.09	1.26	2.26	1.39	0.15	8.36	5.76	14.12
15	2.22	0.36	0.59	0.08	0.11	1.26	2.26	1.49	0.16	8.52	6.17	14.70
20	2.22	0.37	0.63	0.08	0.13	1.26	2.26	1.60	0.17	8.72	6.65	15.36
25	2.23	0.38	0.66	0.09	0.14	1.26	2.26	1.73	0.19	8.94	7.20	16.14
30	2.25	0.39	0.70	0.09	0.16	1.26	2.26	1.89	0.20	9.20	7.86	17.06
35	2.29	0.40	0.73	0.10	0.18	1.26	2.26	2.08	0.23	9.52	8.64	18.16
40	2.34	0.41	0.77	0.10	0.20	1.26	2.26	2.31	0.25	9.90	9.61	19.50
45	2.42	0.42	0.80	0.11	0.22	1.26	2.26	2.60	0.28	10.37	10.81	21.17
50	2.54	0.43	0.84	0.11	0.24	1.26	2.26	2.97	0.32	10.96	12.35	23.32

Table VOC Big Cars 14 Economic Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.30	0.39	0.51	0.07	0.05	1.51	2.71	1.27	0.14	8.96	5.27	14.23
5	2.29	0.40	0.55	0.08	0.07	1.51	2.71	1.35	0.15	9.10	5.62	14.72
10	2.28	0.41	0.58	0.08	0.09	1.51	2.71	1.45	0.16	9.26	6.01	15.27
15	2.27	0.42	0.61	0.09	0.11	1.51	2.71	1.55	0.17	9.45	6.45	15.90
20	2.28	0.44	0.65	0.09	0.13	1.51	2.71	1.68	0.18	9.66	6.98	16.64
25	2.30	0.45	0.68	0.09	0.14	1.51	2.71	1.83	0.20	9.91	7.59	17.50
30	2.33	0.46	0.72	0.10	0.16	1.51	2.71	2.00	0.22	10.21	8.32	18.53
35	2.38	0.48	0.75	0.10	0.18	1.51	2.71	2.22	0.24	10.57	9.21	19.77
40	2.45	0.49	0.79	0.11	0.20	1.51	2.71	2.48	0.27	11.00	10.31	21.31
45	2.55	0.51	0.82	0.11	0.22	1.51	2.71	2.82	0.30	11.55	11.70	23.25
50	2.69	0.52	0.86	0.12	0.24	1.51	2.71	3.26	0.35	12.25	13.54	25.79

Table VOC Big Cars 15 Economic Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.15	0.19	0.38	0.04	0.05	0.00	0.00	0.93	0.10	3.85	5.22	9.07
5	2.10	0.19	0.42	0.04	0.07	0.00	0.00	0.98	0.11	3.91	5.48	9.39
10	2.05	0.20	0.45	0.04	0.09	0.00	0.00	1.03	0.11	3.98	5.78	9.76
15	2.01	0.20	0.49	0.05	0.11	0.00	0.00	1.09	0.12	4.07	6.11	10.18
20	1.98	0.20	0.52	0.05	0.13	0.00	0.00	1.16	0.13	4.17	6.48	10.64
25	1.95	0.20	0.56	0.06	0.14	0.00	0.00	1.23	0.13	4.28	6.89	11.17
30	1.93	0.21	0.59	0.06	0.16	0.00	0.00	1.32	0.14	4.41	7.37	11.78
35	1.91	0.21	0.63	0.07	0.18	0.00	0.00	1.42	0.15	4.57	7.91	12.47
40	1.91	0.21	0.66	0.07	0.20	0.00	0.00	1.53	0.17	4.75	8.54	13.28
45	1.92	0.22	0.69	0.08	0.22	0.00	0.00	1.66	0.18	4.96	9.28	14.23
50	1.93	0.22	0.73	0.08	0.24	0.00	0.00	1.82	0.20	5.21	10.15	15.36

Table VOC Big Cars 16 Economic Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.18	0.21	0.40	0.04	0.05	0.25	0.45	0.96	0.10	4.64	5.34	9.98
5	2.13	0.21	0.43	0.05	0.07	0.25	0.45	1.01	0.11	4.71	5.62	10.33
10	2.09	0.21	0.47	0.05	0.09	0.25	0.45	1.06	0.11	4.79	5.93	10.72
15	2.05	0.21	0.50	0.05	0.11	0.25	0.45	1.12	0.12	4.88	6.28	11.16
20	2.02	0.22	0.54	0.06	0.13	0.25	0.45	1.19	0.13	4.98	6.67	11.66
25	2.00	0.22	0.57	0.06	0.14	0.25	0.45	1.27	0.14	5.11	7.11	12.22
30	1.98	0.22	0.61	0.07	0.16	0.25	0.45	1.36	0.15	5.25	7.62	12.87
35	1.97	0.23	0.64	0.07	0.18	0.25	0.45	1.47	0.16	5.42	8.20	13.62
40	1.97	0.23	0.68	0.08	0.20	0.25	0.45	1.59	0.17	5.61	8.88	14.49
45	1.98	0.23	0.71	0.08	0.22	0.25	0.45	1.73	0.19	5.84	9.68	15.52
50	2.01	0.24	0.74	0.08	0.24	0.25	0.45	1.90	0.21	6.12	10.64	16.75

Table VOC Big Cars 17 Economic Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.21	0.22	0.42	0.05	0.05	0.50	0.90	0.98	0.11	5.44	5.47	10.91
5	2.17	0.22	0.45	0.05	0.07	0.50	0.90	1.03	0.11	5.51	5.77	11.28
10	2.13	0.23	0.48	0.05	0.09	0.50	0.90	1.09	0.12	5.60	6.10	11.69
15	2.09	0.23	0.52	0.06	0.11	0.50	0.90	1.16	0.13	5.70	6.46	12.16
20	2.06	0.23	0.55	0.06	0.13	0.50	0.90	1.23	0.13	5.81	6.88	12.69
25	2.04	0.24	0.59	0.07	0.14	0.50	0.90	1.32	0.14	5.94	7.35	13.29
30	2.03	0.24	0.62	0.07	0.16	0.50	0.90	1.41	0.15	6.10	7.89	13.98
35	2.02	0.24	0.66	0.08	0.18	0.50	0.90	1.52	0.16	6.28	8.51	14.79
40	2.03	0.25	0.69	0.08	0.20	0.50	0.90	1.65	0.18	6.49	9.24	15.73
45	2.05	0.25	0.73	0.08	0.22	0.50	0.90	1.81	0.20	6.74	10.12	16.86
50	2.08	0.26	0.76	0.09	0.24	0.50	0.90	2.00	0.22	7.04	11.17	18.21

Table VOC Big Cars 18 Economic Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.25	0.24	0.43	0.05	0.05	0.75	1.36	1.00	0.11	6.24	5.61	11.85
5	2.20	0.24	0.47	0.05	0.07	0.75	1.36	1.06	0.11	6.32	5.92	12.24
10	2.17	0.24	0.50	0.06	0.09	0.75	1.36	1.12	0.12	6.41	6.27	12.68
15	2.14	0.25	0.53	0.06	0.11	0.75	1.36	1.19	0.13	6.52	6.66	13.17
20	2.11	0.25	0.57	0.07	0.13	0.75	1.36	1.27	0.14	6.64	7.09	13.74
25	2.09	0.26	0.60	0.07	0.14	0.75	1.36	1.36	0.15	6.78	7.60	14.38
30	2.08	0.26	0.64	0.08	0.16	0.75	1.36	1.46	0.16	6.95	8.18	15.13
35	2.08	0.26	0.67	0.08	0.18	0.75	1.36	1.58	0.17	7.15	8.85	15.99
40	2.09	0.27	0.71	0.08	0.20	0.75	1.36	1.73	0.19	7.38	9.64	17.02
45	2.12	0.27	0.74	0.09	0.22	0.75	1.36	1.90	0.21	7.65	10.60	18.25
50	2.16	0.28	0.78	0.09	0.24	0.75	1.36	2.10	0.23	7.99	11.76	19.74

Table VOC Big Cars 19 Economic Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.28	0.26	0.45	0.05	0.05	1.01	1.81	1.03	0.11	7.05	5.76	12.81
5	2.24	0.26	0.48	0.06	0.07	1.01	1.81	1.09	0.12	7.13	6.08	13.22
10	2.21	0.26	0.52	0.06	0.09	1.01	1.81	1.15	0.12	7.23	6.45	13.68
15	2.18	0.27	0.55	0.07	0.11	1.01	1.81	1.23	0.13	7.35	6.86	14.21
20	2.16	0.27	0.58	0.07	0.13	1.01	1.81	1.31	0.14	7.48	7.33	14.81
25	2.14	0.28	0.62	0.08	0.14	1.01	1.81	1.41	0.15	7.64	7.86	15.50
30	2.14	0.28	0.65	0.08	0.16	1.01	1.81	1.52	0.16	7.82	8.49	16.30
35	2.14	0.29	0.69	0.08	0.18	1.01	1.81	1.65	0.18	8.03	9.21	17.24
40	2.16	0.29	0.72	0.09	0.20	1.01	1.81	1.80	0.20	8.28	10.08	18.36
45	2.19	0.30	0.76	0.09	0.22	1.01	1.81	1.99	0.22	8.58	11.12	19.71
50	2.25	0.31	0.79	0.10	0.24	1.01	1.81	2.22	0.24	8.95	12.41	21.36

Table VOC Big Cars 20 Economic Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.30	0.19	0.38	0.04	0.05	0.00	0.00	0.81	0.09	3.87	10.00	13.87
5	2.27	0.19	0.42	0.04	0.07	0.00	0.00	0.83	0.09	3.91	10.22	14.13
10	2.23	0.20	0.45	0.04	0.09	0.00	0.00	0.85	0.09	3.96	10.44	14.39
15	2.20	0.20	0.49	0.05	0.11	0.00	0.00	0.87	0.09	4.00	10.67	14.67
20	2.16	0.20	0.52	0.05	0.13	0.00	0.00	0.89	0.10	4.05	10.92	14.97
25	2.13	0.20	0.56	0.06	0.14	0.00	0.00	0.91	0.10	4.10	11.17	15.27
30	2.10	0.21	0.59	0.06	0.16	0.00	0.00	0.93	0.10	4.15	11.44	15.59
35	2.07	0.21	0.63	0.07	0.18	0.00	0.00	0.95	0.10	4.21	11.72	15.93
40	2.04	0.21	0.66	0.07	0.20	0.00	0.00	0.98	0.11	4.27	12.02	16.28
45	2.01	0.22	0.69	0.08	0.22	0.00	0.00	1.00	0.11	4.33	12.33	16.65
50	1.98	0.22	0.73	0.08	0.24	0.00	0.00	1.03	0.11	4.39	12.65	17.04

Table VOC Big Cars 21 Economic Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.31	0.21	0.40	0.04	0.05	0.25	0.45	0.84	0.09	4.65	10.37	15.01
5	2.27	0.21	0.43	0.05	0.07	0.25	0.45	0.86	0.09	4.69	10.60	15.29
10	2.24	0.21	0.47	0.05	0.09	0.25	0.45	0.88	0.10	4.74	10.84	15.57
15	2.21	0.21	0.50	0.05	0.11	0.25	0.45	0.90	0.10	4.79	11.09	15.88
20	2.18	0.22	0.54	0.06	0.13	0.25	0.45	0.92	0.10	4.84	11.35	16.19
25	2.15	0.22	0.57	0.06	0.14	0.25	0.45	0.95	0.10	4.90	11.63	16.52
30	2.12	0.22	0.61	0.07	0.16	0.25	0.45	0.97	0.10	4.95	11.92	16.87
35	2.09	0.23	0.64	0.07	0.18	0.25	0.45	0.99	0.11	5.01	12.22	17.24
40	2.06	0.23	0.68	0.08	0.20	0.25	0.45	1.02	0.11	5.07	12.54	17.62
45	2.03	0.23	0.71	0.08	0.22	0.25	0.45	1.05	0.11	5.14	12.88	18.02
50	2.01	0.24	0.74	0.08	0.24	0.25	0.45	1.08	0.12	5.21	13.24	18.45

Table VOC Big Cars 22 Economic Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.22	0.42	0.05	0.05	0.50	0.90	0.88	0.09	5.43	10.76	16.19
5	2.29	0.22	0.45	0.05	0.07	0.50	0.90	0.90	0.10	5.48	11.00	16.48
10	2.25	0.23	0.48	0.05	0.09	0.50	0.90	0.92	0.10	5.53	11.26	16.79
15	2.22	0.23	0.52	0.06	0.11	0.50	0.90	0.94	0.10	5.58	11.54	17.12
20	2.19	0.23	0.55	0.06	0.13	0.50	0.90	0.96	0.10	5.64	11.82	17.46
25	2.16	0.24	0.59	0.07	0.14	0.50	0.90	0.99	0.11	5.70	12.12	17.82
30	2.14	0.24	0.62	0.07	0.16	0.50	0.90	1.01	0.11	5.76	12.44	18.20
35	2.11	0.24	0.66	0.08	0.18	0.50	0.90	1.04	0.11	5.83	12.77	18.60
40	2.09	0.25	0.69	0.08	0.20	0.50	0.90	1.07	0.12	5.89	13.12	19.02
45	2.06	0.25	0.73	0.08	0.22	0.50	0.90	1.10	0.12	5.96	13.49	19.46
50	2.04	0.26	0.76	0.09	0.24	0.50	0.90	1.13	0.12	6.04	13.89	19.92

Table VOC Big Cars 23 Economic Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.35	0.18	0.37	0.03	0.05	0.00	0.00	0.78	0.08	3.87	9.65	13.51
5	2.32	0.19	0.41	0.04	0.07	0.00	0.00	0.80	0.09	3.91	9.85	13.75
10	2.28	0.19	0.44	0.04	0.09	0.00	0.00	0.82	0.09	3.95	10.06	14.00
15	2.24	0.19	0.48	0.05	0.11	0.00	0.00	0.84	0.09	3.99	10.27	14.26
20	2.21	0.19	0.51	0.05	0.13	0.00	0.00	0.85	0.09	4.03	10.50	14.54
25	2.17	0.20	0.55	0.05	0.14	0.00	0.00	0.87	0.09	4.08	10.74	14.82
30	2.14	0.20	0.58	0.06	0.16	0.00	0.00	0.89	0.10	4.13	10.99	15.12
35	2.10	0.20	0.62	0.06	0.18	0.00	0.00	0.92	0.10	4.18	11.25	15.43
40	2.07	0.20	0.65	0.07	0.20	0.00	0.00	0.94	0.10	4.23	11.53	15.76
45	2.04	0.21	0.68	0.07	0.22	0.00	0.00	0.96	0.10	4.29	11.82	16.10
50	2.01	0.21	0.72	0.08	0.24	0.00	0.00	0.99	0.11	4.35	12.12	16.47

Table VOC Big Cars 24 Economic Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.36	0.19	0.38	0.04	0.05	0.25	0.45	0.81	0.09	4.63	9.99	14.61
5	2.32	0.19	0.42	0.04	0.07	0.25	0.45	0.83	0.09	4.67	10.20	14.87
10	2.28	0.20	0.45	0.04	0.09	0.25	0.45	0.85	0.09	4.71	10.43	15.14
15	2.25	0.20	0.49	0.05	0.11	0.25	0.45	0.87	0.09	4.76	10.66	15.42
20	2.22	0.20	0.52	0.05	0.13	0.25	0.45	0.89	0.10	4.81	10.91	15.71
25	2.18	0.20	0.56	0.06	0.14	0.25	0.45	0.91	0.10	4.86	11.17	16.02
30	2.15	0.21	0.59	0.06	0.16	0.25	0.45	0.93	0.10	4.91	11.44	16.35
35	2.12	0.21	0.63	0.07	0.18	0.25	0.45	0.95	0.10	4.96	11.72	16.68
40	2.09	0.21	0.66	0.07	0.20	0.25	0.45	0.98	0.11	5.02	12.02	17.04
45	2.06	0.22	0.69	0.08	0.22	0.25	0.45	1.00	0.11	5.08	12.33	17.41
50	2.04	0.22	0.73	0.08	0.24	0.25	0.45	1.03	0.11	5.14	12.66	17.81

Table VOC Big Cars 25
Economic Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.36	0.20	0.39	0.04	0.05	0.50	0.90	0.84	0.09	5.39	10.35	15.74
5	2.33	0.20	0.43	0.04	0.07	0.50	0.90	0.86	0.09	5.44	10.58	16.02
10	2.29	0.21	0.46	0.05	0.09	0.50	0.90	0.88	0.10	5.48	10.83	16.31
15	2.26	0.21	0.50	0.05	0.11	0.50	0.90	0.90	0.10	5.53	11.08	16.61
20	2.23	0.21	0.53	0.06	0.13	0.50	0.90	0.92	0.10	5.59	11.35	16.93
25	2.20	0.21	0.57	0.06	0.14	0.50	0.90	0.95	0.10	5.64	11.63	17.27
30	2.17	0.22	0.60	0.07	0.16	0.50	0.90	0.97	0.10	5.70	11.92	17.62
35	2.14	0.22	0.64	0.07	0.18	0.50	0.90	0.99	0.11	5.76	12.23	17.98
40	2.11	0.22	0.67	0.07	0.20	0.50	0.90	1.02	0.11	5.82	12.55	18.37
45	2.09	0.23	0.70	0.08	0.22	0.50	0.90	1.05	0.11	5.88	12.89	18.78
50	2.06	0.23	0.74	0.08	0.24	0.50	0.90	1.08	0.12	5.95	13.26	19.21

Table VOC Big Cars 26
Economic Cost of Operation of Big Cars on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.19	0.38	0.04	0.05	0.00	0.00	0.80	0.09	3.88	9.81	13.69
5	2.29	0.19	0.42	0.04	0.07	0.00	0.00	0.81	0.09	3.92	10.02	13.94
10	2.25	0.20	0.45	0.04	0.09	0.00	0.00	0.83	0.09	3.96	10.24	14.20
15	2.22	0.20	0.49	0.05	0.11	0.00	0.00	0.85	0.09	4.01	10.46	14.47
20	2.18	0.20	0.52	0.05	0.13	0.00	0.00	0.87	0.09	4.05	10.70	14.76
25	2.15	0.20	0.56	0.06	0.14	0.00	0.00	0.89	0.10	4.10	10.96	15.06
30	2.12	0.21	0.59	0.06	0.16	0.00	0.00	0.91	0.10	4.15	11.22	15.37
35	2.08	0.21	0.63	0.07	0.18	0.00	0.00	0.94	0.10	4.20	11.49	15.70
40	2.05	0.21	0.66	0.07	0.20	0.00	0.00	0.96	0.10	4.26	11.78	16.04
45	2.03	0.22	0.69	0.08	0.22	0.00	0.00	0.98	0.11	4.32	12.09	16.41
50	2.00	0.22	0.73	0.08	0.24	0.00	0.00	1.01	0.11	4.38	12.41	16.79

Table VOC Big Cars 27 Economic Cost of Operation of Big Cars on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.33	0.21	0.40	0.04	0.05	0.25	0.45	0.83	0.09	4.65	10.16	14.82
5	2.30	0.21	0.43	0.05	0.07	0.25	0.45	0.85	0.09	4.70	10.39	15.09
10	2.26	0.21	0.47	0.05	0.09	0.25	0.45	0.86	0.09	4.74	10.63	15.37
15	2.23	0.21	0.50	0.05	0.11	0.25	0.45	0.88	0.10	4.79	10.87	15.66
20	2.19	0.22	0.54	0.06	0.13	0.25	0.45	0.91	0.10	4.84	11.13	15.97
25	2.16	0.22	0.57	0.06	0.14	0.25	0.45	0.93	0.10	4.89	11.40	16.29
30	2.13	0.22	0.61	0.07	0.16	0.25	0.45	0.95	0.10	4.95	11.69	16.63
35	2.10	0.23	0.64	0.07	0.18	0.25	0.45	0.98	0.11	5.01	11.99	16.99
40	2.07	0.23	0.68	0.08	0.20	0.25	0.45	1.00	0.11	5.07	12.30	17.37
45	2.05	0.23	0.71	0.08	0.22	0.25	0.45	1.03	0.11	5.13	12.63	17.76
50	2.02	0.24	0.74	0.08	0.24	0.25	0.45	1.06	0.11	5.20	12.99	18.18

Table VOC Big Cars 28 Economic Cost of Operation of Big Cars on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.34	0.22	0.42	0.05	0.05	0.50	0.90	0.86	0.09	5.43	10.55	15.98
5	2.31	0.22	0.45	0.05	0.07	0.50	0.90	0.88	0.10	5.48	10.79	16.27
10	2.27	0.23	0.48	0.05	0.09	0.50	0.90	0.90	0.10	5.53	11.05	16.58
15	2.24	0.23	0.52	0.06	0.11	0.50	0.90	0.92	0.10	5.58	11.31	16.90
20	2.21	0.23	0.55	0.06	0.13	0.50	0.90	0.94	0.10	5.64	11.59	17.23
25	2.18	0.24	0.59	0.07	0.14	0.50	0.90	0.97	0.10	5.69	11.89	17.58
30	2.15	0.24	0.62	0.07	0.16	0.50	0.90	0.99	0.11	5.75	12.20	17.95
35	2.12	0.24	0.66	0.08	0.18	0.50	0.90	1.02	0.11	5.82	12.52	18.34
40	2.10	0.25	0.69	0.08	0.20	0.50	0.90	1.05	0.11	5.88	12.87	18.75
45	2.07	0.25	0.73	0.08	0.22	0.50	0.90	1.08	0.12	5.95	13.23	19.18
50	2.05	0.26	0.76	0.09	0.24	0.50	0.90	1.11	0.12	6.02	13.62	19.64

Table VOC Big Cars 29 Economic Cost of Operation of Big Cars on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.37	0.18	0.37	0.03	0.05	0.00	0.00	0.78	0.08	3.87	9.55	13.43
5	2.33	0.19	0.41	0.04	0.07	0.00	0.00	0.79	0.09	3.91	9.75	13.66
10	2.29	0.19	0.44	0.04	0.09	0.00	0.00	0.81	0.09	3.95	9.96	13.91
15	2.25	0.19	0.48	0.05	0.11	0.00	0.00	0.83	0.09	3.99	10.18	14.17
20	2.22	0.19	0.51	0.05	0.13	0.00	0.00	0.85	0.09	4.04	10.40	14.44
25	2.18	0.20	0.55	0.05	0.14	0.00	0.00	0.87	0.09	4.08	10.64	14.72
30	2.15	0.20	0.58	0.06	0.16	0.00	0.00	0.89	0.10	4.13	10.89	15.02
35	2.11	0.20	0.62	0.06	0.18	0.00	0.00	0.91	0.10	4.18	11.15	15.33
40	2.08	0.20	0.65	0.07	0.20	0.00	0.00	0.93	0.10	4.23	11.42	15.65
45	2.05	0.21	0.68	0.07	0.22	0.00	0.00	0.95	0.10	4.29	11.70	15.99
50	2.02	0.21	0.72	0.08	0.24	0.00	0.00	0.98	0.11	4.34	12.00	16.35

Table VOC Big Cars 30 Economic Cost of Operation of Big Cars on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.37	0.19	0.38	0.04	0.05	0.25	0.45	0.80	0.09	4.63	9.89	14.52
5	2.33	0.19	0.42	0.04	0.07	0.25	0.45	0.82	0.09	4.67	10.10	14.78
10	2.30	0.20	0.45	0.04	0.09	0.25	0.45	0.84	0.09	4.72	10.33	15.04
15	2.26	0.20	0.49	0.05	0.11	0.25	0.45	0.86	0.09	4.76	10.56	15.32
20	2.23	0.20	0.52	0.05	0.13	0.25	0.45	0.88	0.10	4.81	10.81	15.61
25	2.19	0.20	0.56	0.06	0.14	0.25	0.45	0.90	0.10	4.86	11.06	15.92
30	2.16	0.21	0.59	0.06	0.16	0.25	0.45	0.92	0.10	4.91	11.33	16.24
35	2.13	0.21	0.63	0.07	0.18	0.25	0.45	0.94	0.10	4.96	11.61	16.57
40	2.10	0.21	0.66	0.07	0.20	0.25	0.45	0.97	0.10	5.02	11.90	16.92
45	2.07	0.22	0.69	0.08	0.22	0.25	0.45	0.99	0.11	5.08	12.22	17.29
50	2.04	0.22	0.73	0.08	0.24	0.25	0.45	1.02	0.11	5.14	12.54	17.68

Table VOC Big Cars 31 Economic Cost of Operation of Big Cars on Six Lane Divided Expressways (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.38	0.20	0.39	0.04	0.05	0.50	0.90	0.83	0.09	5.39	10.25	15.65
5	2.34	0.20	0.43	0.04	0.07	0.50	0.90	0.85	0.09	5.44	10.48	15.92
10	2.30	0.21	0.46	0.05	0.09	0.50	0.90	0.87	0.09	5.49	10.72	16.21
15	2.27	0.21	0.50	0.05	0.11	0.50	0.90	0.89	0.10	5.53	10.98	16.51
20	2.24	0.21	0.53	0.06	0.13	0.50	0.90	0.91	0.10	5.58	11.24	16.83
25	2.21	0.21	0.57	0.06	0.14	0.50	0.90	0.94	0.10	5.64	11.52	17.16
30	2.18	0.22	0.60	0.07	0.16	0.50	0.90	0.96	0.10	5.69	11.81	17.50
35	2.15	0.22	0.64	0.07	0.18	0.50	0.90	0.99	0.11	5.75	12.11	17.87
40	2.12	0.22	0.67	0.07	0.20	0.50	0.90	1.01	0.11	5.81	12.44	18.25
45	2.09	0.23	0.70	0.08	0.22	0.50	0.90	1.04	0.11	5.88	12.77	18.65
50	2.07	0.23	0.74	0.08	0.24	0.50	0.90	1.07	0.12	5.95	13.13	19.08

Table VOC Big Cars 32 Economic Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.41	0.18	0.37	0.03	0.05	0.00	0.00	0.76	0.08	3.88	9.31	13.19
5	2.37	0.18	0.40	0.04	0.07	0.00	0.00	0.77	0.08	3.92	9.50	13.42
10	2.33	0.19	0.44	0.04	0.09	0.00	0.00	0.79	0.09	3.96	9.70	13.65
15	2.29	0.19	0.47	0.04	0.11	0.00	0.00	0.81	0.09	3.99	9.90	13.90
20	2.25	0.19	0.51	0.05	0.13	0.00	0.00	0.82	0.09	4.04	10.12	14.15
25	2.22	0.19	0.54	0.05	0.14	0.00	0.00	0.84	0.09	4.08	10.34	14.42
30	2.18	0.19	0.58	0.06	0.16	0.00	0.00	0.86	0.09	4.12	10.57	14.70
35	2.14	0.20	0.61	0.06	0.18	0.00	0.00	0.88	0.10	4.17	10.82	14.99
40	2.11	0.20	0.64	0.07	0.20	0.00	0.00	0.90	0.10	4.22	11.07	15.29
45	2.08	0.20	0.68	0.07	0.22	0.00	0.00	0.92	0.10	4.27	11.34	15.61
50	2.05	0.20	0.71	0.08	0.24	0.00	0.00	0.95	0.10	4.32	11.62	15.95

Table VOC Big Cars 33
Economic Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.41	0.19	0.38	0.03	0.05	0.25	0.45	0.78	0.08	4.63	9.63	14.26
5	2.37	0.19	0.41	0.04	0.07	0.25	0.45	0.80	0.09	4.67	9.84	14.50
10	2.33	0.19	0.45	0.04	0.09	0.25	0.45	0.82	0.09	4.71	10.05	14.76
15	2.29	0.19	0.48	0.05	0.11	0.25	0.45	0.84	0.09	4.75	10.27	15.02
20	2.26	0.20	0.51	0.05	0.13	0.25	0.45	0.85	0.09	4.80	10.50	15.29
25	2.22	0.20	0.55	0.06	0.14	0.25	0.45	0.87	0.09	4.84	10.74	15.58
30	2.19	0.20	0.58	0.06	0.16	0.25	0.45	0.89	0.10	4.89	10.99	15.88
35	2.16	0.20	0.62	0.06	0.18	0.25	0.45	0.92	0.10	4.94	11.25	16.20
40	2.13	0.21	0.65	0.07	0.20	0.25	0.45	0.94	0.10	5.00	11.53	16.53
45	2.10	0.21	0.69	0.07	0.22	0.25	0.45	0.96	0.10	5.05	11.82	16.87
50	2.07	0.21	0.72	0.08	0.24	0.25	0.45	0.99	0.11	5.11	12.13	17.24

Table VOC Big Cars 34
Economic Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.41	0.19	0.38	0.04	0.05	0.50	0.90	0.81	0.09	5.38	9.98	15.36
5	2.37	0.19	0.42	0.04	0.07	0.50	0.90	0.83	0.09	5.43	10.19	15.62
10	2.34	0.20	0.45	0.04	0.09	0.50	0.90	0.85	0.09	5.47	10.42	15.89
15	2.30	0.20	0.49	0.05	0.11	0.50	0.90	0.87	0.09	5.51	10.66	16.17
20	2.27	0.20	0.52	0.05	0.13	0.50	0.90	0.89	0.10	5.56	10.91	16.47
25	2.24	0.20	0.56	0.06	0.14	0.50	0.90	0.91	0.10	5.61	11.17	16.78
30	2.20	0.21	0.59	0.06	0.16	0.50	0.90	0.93	0.10	5.67	11.44	17.11
35	2.17	0.21	0.63	0.07	0.18	0.50	0.90	0.95	0.10	5.72	11.73	17.45
40	2.14	0.21	0.66	0.07	0.20	0.50	0.90	0.98	0.11	5.78	12.03	17.81
45	2.12	0.22	0.69	0.08	0.22	0.50	0.90	1.00	0.11	5.84	12.35	18.19
50	2.09	0.22	0.73	0.08	0.24	0.50	0.90	1.03	0.11	5.90	12.68	18.58

Table VOC Big Cars 35 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.81	0.33	0.84	0.09	0.11	0.00	0.00	1.16	0.22	7.55	4.74	12.29
5	4.74	0.33	0.91	0.10	0.15	0.00	0.00	1.22	0.23	7.68	5.00	12.69
10	4.69	0.34	0.98	0.11	0.19	0.00	0.00	1.29	0.25	7.84	5.30	13.13
15	4.65	0.34	1.05	0.12	0.23	0.00	0.00	1.37	0.26	8.01	5.62	13.64
20	4.62	0.35	1.12	0.12	0.27	0.00	0.00	1.46	0.28	8.22	5.99	14.21
25	4.61	0.35	1.19	0.13	0.31	0.00	0.00	1.56	0.30	8.46	6.41	14.87
30	4.62	0.36	1.26	0.14	0.35	0.00	0.00	1.68	0.32	8.73	6.90	15.63
35	4.66	0.36	1.33	0.15	0.38	0.00	0.00	1.82	0.35	9.05	7.47	16.52
40	4.72	0.37	1.40	0.16	0.42	0.00	0.00	1.98	0.38	9.43	8.13	17.57
45	4.82	0.37	1.47	0.17	0.46	0.00	0.00	2.18	0.42	9.89	8.93	18.82
50	4.96	0.38	1.55	0.18	0.50	0.00	0.00	2.41	0.46	10.43	9.90	20.33

Table VOC Big Cars 36 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.89	0.38	0.90	0.11	0.11	0.45	0.81	1.21	0.23	9.09	4.96	14.05
5	4.84	0.38	0.97	0.11	0.15	0.45	0.81	1.28	0.24	9.24	5.25	14.49
10	4.79	0.39	1.04	0.12	0.19	0.45	0.81	1.36	0.26	9.41	5.57	14.98
15	4.77	0.39	1.11	0.13	0.23	0.45	0.81	1.45	0.28	9.61	5.93	15.55
20	4.76	0.40	1.18	0.14	0.27	0.45	0.81	1.55	0.30	9.85	6.35	16.19
25	4.76	0.41	1.25	0.15	0.31	0.45	0.81	1.66	0.32	10.12	6.82	16.94
30	4.79	0.41	1.32	0.16	0.35	0.45	0.81	1.80	0.34	10.43	7.37	17.81
35	4.85	0.42	1.39	0.17	0.38	0.45	0.81	1.95	0.37	10.81	8.02	18.83
40	4.94	0.43	1.46	0.18	0.42	0.45	0.81	2.14	0.41	11.25	8.80	20.05
45	5.07	0.44	1.53	0.18	0.46	0.45	0.81	2.37	0.45	11.78	9.74	21.52
50	5.26	0.45	1.60	0.19	0.50	0.45	0.81	2.66	0.51	12.43	10.90	23.34

Table VOC Big Cars 37 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.99	0.44	0.96	0.12	0.11	0.90	1.62	1.27	0.24	10.65	5.20	15.86
5	4.94	0.45	1.03	0.13	0.15	0.90	1.62	1.34	0.26	10.83	5.52	16.34
10	4.91	0.46	1.10	0.14	0.19	0.90	1.62	1.43	0.27	11.03	5.87	16.90
15	4.90	0.47	1.17	0.15	0.23	0.90	1.62	1.53	0.29	11.26	6.28	17.54
20	4.90	0.48	1.24	0.16	0.27	0.90	1.62	1.64	0.31	11.52	6.74	18.27
25	4.93	0.49	1.31	0.17	0.31	0.90	1.62	1.77	0.34	11.84	7.28	19.12
30	4.98	0.50	1.38	0.18	0.35	0.90	1.62	1.93	0.37	12.20	7.92	20.12
35	5.07	0.51	1.45	0.18	0.38	0.90	1.62	2.11	0.40	12.63	8.67	21.30
40	5.19	0.52	1.52	0.19	0.42	0.90	1.62	2.33	0.45	13.15	9.58	22.73
45	5.37	0.53	1.59	0.20	0.46	0.90	1.62	2.61	0.50	13.79	10.71	24.50
50	5.62	0.54	1.66	0.21	0.50	0.90	1.62	2.96	0.57	14.58	12.13	26.72

Table VOC Big Cars 38 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.09	0.54	1.02	0.14	0.11	1.35	2.43	1.33	0.25	12.26	5.47	17.73
5	5.06	0.55	1.09	0.15	0.15	1.35	2.43	1.42	0.27	12.46	5.82	18.28
10	5.04	0.56	1.16	0.16	0.19	1.35	2.43	1.51	0.29	12.69	6.21	18.91
15	5.05	0.58	1.23	0.17	0.23	1.35	2.43	1.62	0.31	12.96	6.67	19.63
20	5.07	0.59	1.30	0.17	0.27	1.35	2.43	1.75	0.34	13.27	7.19	20.46
25	5.12	0.61	1.37	0.18	0.31	1.35	2.43	1.90	0.36	13.63	7.81	21.44
30	5.20	0.62	1.44	0.19	0.35	1.35	2.43	2.08	0.40	14.06	8.54	22.60
35	5.32	0.64	1.51	0.20	0.38	1.35	2.43	2.30	0.44	14.57	9.43	23.99
40	5.48	0.65	1.58	0.21	0.42	1.35	2.43	2.56	0.49	15.19	10.52	25.70
45	5.72	0.67	1.65	0.22	0.46	1.35	2.43	2.90	0.55	15.96	11.89	27.85
50	6.06	0.69	1.72	0.23	0.50	1.35	2.43	3.33	0.64	16.95	13.68	30.63

Table VOC Big Cars 39 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.21	0.69	1.08	0.16	0.11	1.80	3.24	1.40	0.27	13.95	5.76	19.71
5	5.19	0.71	1.15	0.17	0.15	1.80	3.24	1.50	0.29	14.18	6.15	20.33
10	5.19	0.73	1.22	0.17	0.19	1.80	3.24	1.61	0.31	14.45	6.59	21.04
15	5.21	0.75	1.29	0.18	0.23	1.80	3.24	1.73	0.33	14.76	7.11	21.87
20	5.25	0.77	1.36	0.19	0.27	1.80	3.24	1.88	0.36	15.12	7.71	22.83
25	5.33	0.80	1.43	0.20	0.31	1.80	3.24	2.05	0.39	15.54	8.42	23.97
30	5.44	0.83	1.50	0.21	0.35	1.80	3.24	2.26	0.43	16.05	9.28	25.33
35	5.60	0.86	1.57	0.22	0.38	1.80	3.24	2.52	0.48	16.66	10.33	27.00
40	5.82	0.89	1.64	0.23	0.42	1.80	3.24	2.84	0.54	17.42	11.66	29.08
45	6.14	0.92	1.71	0.24	0.46	1.80	3.24	3.26	0.62	18.39	13.37	31.76
50	6.59	0.96	1.78	0.24	0.50	1.80	3.24	3.82	0.73	19.66	15.67	35.33

Table VOC Big Cars 40 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

RF	Fuel Cost	, ,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.33	0.94	1.14	0.17	0.11	2.25	4.05	1.48	0.28	15.76	6.09	21.85
5	5.33	0.98	1.21	0.18	0.15	2.25	4.05	1.59	0.30	16.04	6.52	22.56
10	5.35	1.02	1.28	0.19	0.19	2.25	4.05	1.71	0.33	16.36	7.02	23.39
15	5.39	1.07	1.35	0.20	0.23	2.25	4.05	1.85	0.35	16.74	7.61	24.35
20	5.46	1.12	1.42	0.21	0.27	2.25	4.05	2.02	0.39	17.18	8.31	25.48
25	5.56	1.17	1.49	0.22	0.31	2.25	4.05	2.23	0.43	17.70	9.14	26.84
30	5.71	1.23	1.56	0.23	0.35	2.25	4.05	2.47	0.47	18.32	10.16	28.48
35	5.93	1.30	1.63	0.23	0.38	2.25	4.05	2.79	0.53	19.09	11.43	30.53
40	6.23	1.37	1.70	0.24	0.42	2.25	4.05	3.19	0.61	20.06	13.07	33.14
45	6.66	1.46	1.77	0.25	0.46	2.25	4.05	3.72	0.71	21.33	15.27	36.59
50	7.28	1.55	1.84	0.26	0.50	2.25	4.05	4.47	0.86	23.06	18.34	41.40

Table VOC Big Cars 41 Financial Cost of Operation of Big Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost		_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.47	1.51	1.20	0.19	0.11	2.70	4.86	1.57	0.30	17.91	6.45	24.36
5	5.49	1.62	1.27	0.20	0.15	2.70	4.86	1.69	0.32	18.29	6.94	25.23
10	5.52	1.73	1.34	0.21	0.19	2.70	4.86	1.83	0.35	18.73	7.51	26.24
15	5.59	1.87	1.41	0.22	0.23	2.70	4.86	2.00	0.38	19.24	8.19	27.43
20	5.69	2.02	1.48	0.23	0.27	2.70	4.86	2.19	0.42	19.85	9.00	28.85
25	5.83	2.21	1.55	0.23	0.31	2.70	4.86	2.43	0.47	20.58	9.99	30.57
30	6.03	2.43	1.62	0.24	0.35	2.70	4.86	2.73	0.52	21.48	11.22	32.70
35	6.32	2.70	1.69	0.25	0.38	2.70	4.86	3.12	0.60	22.62	12.79	35.41
40	6.72	3.05	1.76	0.26	0.42	2.70	4.86	3.63	0.69	24.09	14.88	38.97
45	7.31	3.49	1.83	0.27	0.46	2.70	4.86	4.33	0.83	26.08	17.79	43.87
50	8.22	4.08	1.90	0.28	0.50	2.70	4.86	5.39	1.03	28.95	22.11	51.06

Table VOC Big Cars 42 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	4.92	0.30	0.80	0.08	0.11	0.00	0.00	1.05	0.20	7.47	4.31	11.78
5	4.83	0.31	0.87	0.09	0.15	0.00	0.00	1.10	0.21	7.57	4.53	12.10
10	4.75	0.31	0.94	0.10	0.19	0.00	0.00	1.17	0.22	7.68	4.79	12.47
15	4.69	0.31	1.01	0.10	0.23	0.00	0.00	1.23	0.24	7.82	5.07	12.89
20	4.64	0.32	1.09	0.11	0.27	0.00	0.00	1.31	0.25	7.98	5.38	13.36
25	4.60	0.32	1.16	0.12	0.31	0.00	0.00	1.40	0.27	8.17	5.74	13.91
30	4.58	0.33	1.23	0.13	0.35	0.00	0.00	1.50	0.29	8.39	6.15	14.54
35	4.58	0.33	1.30	0.14	0.38	0.00	0.00	1.61	0.31	8.65	6.62	15.27
40	4.60	0.34	1.37	0.15	0.42	0.00	0.00	1.75	0.33	8.96	7.17	16.13
45	4.66	0.34	1.44	0.16	0.46	0.00	0.00	1.90	0.36	9.32	7.82	17.14
50	4.74	0.35	1.51	0.17	0.50	0.00	0.00	2.09	0.40	9.76	8.60	18.35

Table VOC Big Cars 43 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.01	0.33	0.84	0.09	0.11	0.45	0.81	1.08	0.21	8.93	4.44	13.37
5	4.92	0.33	0.91	0.10	0.15	0.45	0.81	1.14	0.22	9.04	4.68	13.72
10	4.85	0.34	0.98	0.11	0.19	0.45	0.81	1.21	0.23	9.17	4.95	14.12
15	4.79	0.34	1.06	0.12	0.23	0.45	0.81	1.28	0.25	9.32	5.25	14.57
20	4.75	0.35	1.13	0.12	0.27	0.45	0.81	1.36	0.26	9.50	5.59	15.09
25	4.72	0.35	1.20	0.13	0.31	0.45	0.81	1.46	0.28	9.71	5.98	15.69
30	4.72	0.36	1.27	0.14	0.35	0.45	0.81	1.57	0.30	9.95	6.43	16.38
35	4.73	0.36	1.34	0.15	0.38	0.45	0.81	1.69	0.32	10.24	6.94	17.19
40	4.77	0.37	1.41	0.16	0.42	0.45	0.81	1.84	0.35	10.58	7.55	18.13
45	4.84	0.37	1.48	0.17	0.46	0.45	0.81	2.02	0.39	10.99	8.28	19.26
50	4.96	0.38	1.55	0.18	0.50	0.45	0.81	2.23	0.43	11.48	9.15	20.63

Table VOC Big Cars 44 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.09	0.36	0.88	0.10	0.11	0.90	1.62	1.12	0.21	10.40	4.59	14.99
5	5.02	0.37	0.95	0.11	0.15	0.90	1.62	1.18	0.23	10.52	4.85	15.37
10	4.95	0.37	1.03	0.12	0.19	0.90	1.62	1.25	0.24	10.67	5.13	15.80
15	4.90	0.38	1.10	0.13	0.23	0.90	1.62	1.33	0.25	10.84	5.46	16.29
20	4.87	0.38	1.17	0.14	0.27	0.90	1.62	1.42	0.27	11.03	5.83	16.86
25	4.86	0.39	1.24	0.15	0.31	0.90	1.62	1.52	0.29	11.27	6.25	17.51
30	4.86	0.40	1.31	0.15	0.35	0.90	1.62	1.64	0.31	11.54	6.73	18.27
35	4.89	0.40	1.38	0.16	0.38	0.90	1.62	1.78	0.34	11.86	7.30	19.16
40	4.95	0.41	1.45	0.17	0.42	0.90	1.62	1.94	0.37	12.24	7.98	20.22
45	5.04	0.42	1.52	0.18	0.46	0.90	1.62	2.14	0.41	12.69	8.79	21.48
50	5.19	0.42	1.59	0.19	0.50	0.90	1.62	2.38	0.46	13.25	9.79	23.04

Table VOC Big Cars 45 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.18	0.40	0.92	0.11	0.11	1.35	2.43	1.16	0.22	11.89	4.74	16.63
5	5.11	0.41	1.00	0.12	0.15	1.35	2.43	1.22	0.23	12.02	5.02	17.04
10	5.06	0.41	1.07	0.13	0.19	1.35	2.43	1.30	0.25	12.18	5.33	17.51
15	5.02	0.42	1.14	0.14	0.23	1.35	2.43	1.38	0.26	12.37	5.68	18.05
20	5.00	0.43	1.21	0.15	0.27	1.35	2.43	1.48	0.28	12.59	6.08	18.67
25	4.99	0.44	1.28	0.16	0.31	1.35	2.43	1.59	0.30	12.85	6.54	19.38
30	5.01	0.45	1.35	0.17	0.35	1.35	2.43	1.72	0.33	13.15	7.07	20.22
35	5.06	0.45	1.42	0.17	0.38	1.35	2.43	1.88	0.36	13.50	7.70	21.21
40	5.14	0.46	1.49	0.18	0.42	1.35	2.43	2.06	0.39	13.93	8.46	22.39
45	5.26	0.47	1.56	0.19	0.46	1.35	2.43	2.28	0.44	14.45	9.37	23.82
50	5.44	0.48	1.63	0.20	0.50	1.35	2.43	2.56	0.49	15.08	10.51	25.60

Table VOC Big Cars 46 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.28	0.45	0.97	0.12	0.11	1.80	3.24	1.20	0.23	13.39	4.91	18.30
5	5.22	0.46	1.04	0.13	0.15	1.80	3.24	1.27	0.24	13.54	5.20	18.74
10	5.17	0.47	1.11	0.14	0.19	1.80	3.24	1.35	0.26	13.72	5.54	19.26
15	5.14	0.48	1.18	0.15	0.23	1.80	3.24	1.44	0.28	13.93	5.91	19.84
20	5.13	0.49	1.25	0.16	0.27	1.80	3.24	1.55	0.30	14.17	6.35	20.52
25	5.14	0.50	1.32	0.17	0.31	1.80	3.24	1.67	0.32	14.46	6.85	21.31
30	5.18	0.51	1.39	0.18	0.35	1.80	3.24	1.81	0.35	14.79	7.44	22.24
35	5.24	0.52	1.46	0.19	0.38	1.80	3.24	1.98	0.38	15.19	8.15	23.34
40	5.35	0.53	1.53	0.19	0.42	1.80	3.24	2.19	0.42	15.67	8.99	24.67
45	5.50	0.54	1.60	0.20	0.46	1.80	3.24	2.45	0.47	16.26	10.04	26.30
50	5.72	0.55	1.67	0.21	0.50	1.80	3.24	2.77	0.53	17.00	11.36	28.36

Table VOC Big Cars 47 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.38	0.51	1.01	0.14	0.11	2.25	4.05	1.24	0.24	14.92	5.08	20.00
5	5.33	0.52	1.08	0.14	0.15	2.25	4.05	1.32	0.25	15.09	5.40	20.49
10	5.29	0.54	1.15	0.15	0.19	2.25	4.05	1.40	0.27	15.28	5.76	21.05
15	5.27	0.55	1.22	0.16	0.23	2.25	4.05	1.50	0.29	15.52	6.17	21.69
20	5.27	0.56	1.29	0.17	0.27	2.25	4.05	1.62	0.31	15.79	6.65	22.44
25	5.30	0.57	1.36	0.18	0.31	2.25	4.05	1.75	0.34	16.10	7.20	23.31
30	5.35	0.59	1.43	0.19	0.35	2.25	4.05	1.91	0.37	16.48	7.86	24.34
35	5.44	0.60	1.50	0.20	0.38	2.25	4.05	2.11	0.40	16.93	8.64	25.57
40	5.58	0.62	1.57	0.21	0.42	2.25	4.05	2.34	0.45	17.48	9.61	27.08
45	5.77	0.63	1.64	0.21	0.46	2.25	4.05	2.63	0.50	18.15	10.81	28.96
50	6.04	0.65	1.71	0.22	0.50	2.25	4.05	3.01	0.58	19.01	12.35	31.36

Table VOC Big Cars 48 Financial Cost of Operation of Big Cars on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.48	0.60	1.05	0.15	0.11	2.70	4.86	1.28	0.25	16.47	5.27	21.74
5	5.44	0.61	1.12	0.16	0.15	2.70	4.86	1.37	0.26	16.66	5.62	22.28
10	5.42	0.63	1.19	0.16	0.19	2.70	4.86	1.46	0.28	16.88	6.01	22.89
15	5.41	0.64	1.26	0.17	0.23	2.70	4.86	1.57	0.30	17.14	6.45	23.60
20	5.43	0.66	1.33	0.18	0.27	2.70	4.86	1.70	0.33	17.45	6.98	24.42
25	5.47	0.68	1.40	0.19	0.31	2.70	4.86	1.85	0.35	17.80	7.59	25.39
30	5.54	0.70	1.47	0.20	0.35	2.70	4.86	2.03	0.39	18.23	8.32	26.55
35	5.66	0.72	1.54	0.21	0.38	2.70	4.86	2.24	0.43	18.74	9.21	27.95
40	5.82	0.74	1.61	0.22	0.42	2.70	4.86	2.51	0.48	19.36	10.31	29.67
45	6.06	0.77	1.68	0.23	0.46	2.70	4.86	2.85	0.55	20.15	11.70	31.85
50	6.40	0.79	1.75	0.23	0.50	2.70	4.86	3.30	0.63	21.17	13.54	34.71

Table VOC Big Cars 49 Financial Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.11	0.29	0.79	0.07	0.11	0.00	0.00	0.95	0.18	7.50	5.22	12.72
5	4.99	0.30	0.86	0.08	0.15	0.00	0.00	0.99	0.19	7.56	5.48	13.04
10	4.88	0.30	0.93	0.09	0.19	0.00	0.00	1.05	0.20	7.64	5.78	13.42
15	4.79	0.30	1.00	0.10	0.23	0.00	0.00	1.11	0.21	7.73	6.11	13.84
20	4.71	0.31	1.07	0.11	0.27	0.00	0.00	1.17	0.22	7.85	6.48	14.33
25	4.64	0.31	1.14	0.12	0.31	0.00	0.00	1.25	0.24	8.00	6.89	14.89
30	4.59	0.31	1.21	0.13	0.35	0.00	0.00	1.34	0.26	8.17	7.37	15.54
35	4.56	0.32	1.28	0.13	0.38	0.00	0.00	1.43	0.27	8.38	7.91	16.29
40	4.55	0.32	1.35	0.14	0.42	0.00	0.00	1.55	0.30	8.63	8.54	17.17
45	4.56	0.33	1.42	0.15	0.46	0.00	0.00	1.68	0.32	8.92	9.28	18.20
50	4.60	0.33	1.49	0.16	0.50	0.00	0.00	1.84	0.35	9.28	10.15	19.43

Table VOC Big Cars 50 Financial Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

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RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.19	0.31	0.82	0.08	0.11	0.45	0.81	0.97	0.19	8.92	5.34	14.27
5	5.07	0.32	0.89	0.09	0.15	0.45	0.81	1.02	0.20	8.99	5.62	14.62
10	4.97	0.32	0.96	0.10	0.19	0.45	0.81	1.08	0.21	9.08	5.93	15.01
15	4.88	0.32	1.03	0.11	0.23	0.45	0.81	1.14	0.22	9.19	6.28	15.47
20	4.81	0.33	1.10	0.12	0.27	0.45	0.81	1.21	0.23	9.32	6.67	15.99
25	4.75	0.33	1.17	0.13	0.31	0.45	0.81	1.29	0.25	9.48	7.11	16.59
30	4.71	0.34	1.24	0.13	0.35	0.45	0.81	1.38	0.26	9.67	7.62	17.29
35	4.68	0.34	1.31	0.14	0.38	0.45	0.81	1.49	0.28	9.89	8.20	18.09
40	4.68	0.35	1.38	0.15	0.42	0.45	0.81	1.61	0.31	10.16	8.88	19.04
45	4.71	0.35	1.45	0.16	0.46	0.45	0.81	1.75	0.34	10.49	9.68	20.17
50	4.77	0.36	1.52	0.17	0.50	0.45	0.81	1.93	0.37	10.88	10.64	21.52

Table VOC Big Cars 51 Financial Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.27	0.33	0.85	0.09	0.11	0.90	1.62	0.99	0.19	10.35	5.47	15.83
5	5.16	0.34	0.92	0.10	0.15	0.90	1.62	1.05	0.20	10.43	5.77	16.20
10	5.06	0.34	0.99	0.11	0.19	0.90	1.62	1.10	0.21	10.53	6.10	16.62
15	4.98	0.35	1.06	0.12	0.23	0.90	1.62	1.17	0.22	10.65	6.46	17.11
20	4.91	0.35	1.13	0.13	0.27	0.90	1.62	1.25	0.24	10.79	6.88	17.67
25	4.86	0.36	1.20	0.14	0.31	0.90	1.62	1.33	0.25	10.97	7.35	18.31
30	4.83	0.36	1.27	0.14	0.35	0.90	1.62	1.43	0.27	11.18	7.89	19.06
35	4.82	0.37	1.34	0.15	0.38	0.90	1.62	1.54	0.30	11.42	8.51	19.93
40	4.83	0.37	1.41	0.16	0.42	0.90	1.62	1.68	0.32	11.72	9.24	20.96
45	4.87	0.38	1.48	0.17	0.46	0.90	1.62	1.83	0.35	12.07	10.12	22.19
50	4.95	0.39	1.55	0.18	0.50	0.90	1.62	2.02	0.39	12.50	11.17	23.67

Table VOC Big Cars 52 Financial Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.35	0.36	0.88	0.10	0.11	1.35	2.43	1.02	0.19	11.79	5.61	17.40
5	5.25	0.36	0.95	0.11	0.15	1.35	2.43	1.07	0.21	11.88	5.92	17.80
10	5.16	0.37	1.02	0.12	0.19	1.35	2.43	1.14	0.22	11.99	6.27	18.25
15	5.08	0.38	1.09	0.13	0.23	1.35	2.43	1.21	0.23	12.12	6.66	18.78
20	5.02	0.38	1.16	0.14	0.27	1.35	2.43	1.29	0.25	12.28	7.09	19.37
25	4.98	0.39	1.23	0.14	0.31	1.35	2.43	1.38	0.26	12.47	7.60	20.07
30	4.96	0.39	1.30	0.15	0.35	1.35	2.43	1.48	0.28	12.70	8.18	20.87
35	4.96	0.40	1.37	0.16	0.38	1.35	2.43	1.60	0.31	12.97	8.85	21.82
40	4.98	0.41	1.44	0.17	0.42	1.35	2.43	1.75	0.33	13.29	9.64	22.93
45	5.04	0.41	1.51	0.18	0.46	1.35	2.43	1.92	0.37	13.68	10.60	24.28
50	5.14	0.42	1.59	0.19	0.50	1.35	2.43	2.13	0.41	14.16	11.76	25.91

Table VOC Big Cars 53 Financial Cost of Operation of Big Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.44	0.39	0.91	0.11	0.11	1.80	3.24	1.04	0.20	13.24	5.76	18.99
5	5.34	0.39	0.98	0.12	0.15	1.80	3.24	1.10	0.21	13.34	6.08	19.42
10	5.26	0.40	1.05	0.13	0.19	1.80	3.24	1.17	0.22	13.46	6.45	19.90
15	5.19	0.41	1.12	0.14	0.23	1.80	3.24	1.24	0.24	13.60	6.86	20.46
20	5.13	0.42	1.19	0.14	0.27	1.80	3.24	1.33	0.25	13.78	7.33	21.10
25	5.10	0.42	1.27	0.15	0.31	1.80	3.24	1.43	0.27	13.98	7.86	21.85
30	5.09	0.43	1.34	0.16	0.35	1.80	3.24	1.54	0.29	14.23	8.49	22.72
35	5.10	0.44	1.41	0.17	0.38	1.80	3.24	1.67	0.32	14.53	9.21	23.74
40	5.14	0.45	1.48	0.18	0.42	1.80	3.24	1.83	0.35	14.88	10.08	24.96
45	5.22	0.45	1.55	0.19	0.46	1.80	3.24	2.02	0.39	15.31	11.12	26.44
50	5.35	0.46	1.62	0.20	0.50	1.80	3.24	2.25	0.43	15.84	12.41	28.25

Table VOC Big Cars 54 Financial Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.48	0.29	0.79	0.07	0.11	0.00	0.00	0.82	0.16	7.72	10.00	17.73
5	5.39	0.30	0.86	0.08	0.15	0.00	0.00	0.84	0.16	7.78	10.22	17.99
10	5.31	0.30	0.93	0.09	0.19	0.00	0.00	0.86	0.16	7.84	10.44	18.28
15	5.23	0.30	1.00	0.10	0.23	0.00	0.00	0.88	0.17	7.90	10.67	18.57
20	5.15	0.31	1.07	0.11	0.27	0.00	0.00	0.90	0.17	7.97	10.92	18.88
25	5.07	0.31	1.14	0.12	0.31	0.00	0.00	0.92	0.18	8.04	11.17	19.21
30	4.99	0.31	1.21	0.13	0.35	0.00	0.00	0.94	0.18	8.11	11.44	19.55
35	4.92	0.32	1.28	0.13	0.38	0.00	0.00	0.97	0.18	8.19	11.72	19.91
40	4.85	0.32	1.35	0.14	0.42	0.00	0.00	0.99	0.19	8.27	12.02	20.29
45	4.79	0.33	1.42	0.15	0.46	0.00	0.00	1.02	0.19	8.36	12.33	20.68
50	4.72	0.33	1.49	0.16	0.50	0.00	0.00	1.04	0.20	8.45	12.65	21.10

Table VOC Big Cars 55 Financial Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.50	0.31	0.82	0.08	0.11	0.45	0.81	0.85	0.16	9.09	10.37	19.46
5	5.41	0.32	0.89	0.09	0.15	0.45	0.81	0.87	0.17	9.16	10.60	19.75
10	5.33	0.32	0.96	0.10	0.19	0.45	0.81	0.89	0.17	9.22	10.84	20.06
15	5.25	0.32	1.03	0.11	0.23	0.45	0.81	0.91	0.17	9.29	11.09	20.38
20	5.18	0.33	1.10	0.12	0.27	0.45	0.81	0.94	0.18	9.36	11.35	20.72
25	5.11	0.33	1.17	0.13	0.31	0.45	0.81	0.96	0.18	9.44	11.63	21.07
30	5.04	0.34	1.24	0.13	0.35	0.45	0.81	0.98	0.19	9.52	11.92	21.44
35	4.97	0.34	1.31	0.14	0.38	0.45	0.81	1.01	0.19	9.61	12.22	21.83
40	4.90	0.35	1.38	0.15	0.42	0.45	0.81	1.03	0.20	9.70	12.54	22.24
45	4.84	0.35	1.45	0.16	0.46	0.45	0.81	1.06	0.20	9.79	12.88	22.68
50	4.78	0.36	1.52	0.17	0.50	0.45	0.81	1.09	0.21	9.89	13.24	23.13

Table VOC Big Cars 56 Financial Cost of Operation of Big Cars on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.52	0.33	0.85	0.09	0.11	0.90	1.62	0.89	0.17	10.48	10.76	21.24
5	5.44	0.34	0.92	0.10	0.15	0.90	1.62	0.91	0.17	10.55	11.00	21.55
10	5.36	0.34	0.99	0.11	0.19	0.90	1.62	0.93	0.18	10.62	11.26	21.88
15	5.29	0.35	1.06	0.12	0.23	0.90	1.62	0.95	0.18	10.70	11.54	22.23
20	5.22	0.35	1.13	0.13	0.27	0.90	1.62	0.97	0.19	10.78	11.82	22.60
25	5.15	0.36	1.20	0.14	0.31	0.90	1.62	1.00	0.19	10.86	12.12	22.98
30	5.09	0.36	1.27	0.14	0.35	0.90	1.62	1.02	0.20	10.95	12.44	23.39
35	5.02	0.37	1.34	0.15	0.38	0.90	1.62	1.05	0.20	11.04	12.77	23.82
40	4.96	0.37	1.41	0.16	0.42	0.90	1.62	1.08	0.21	11.14	13.12	24.27
45	4.91	0.38	1.48	0.17	0.46	0.90	1.62	1.11	0.21	11.25	13.49	24.74
50	4.85	0.39	1.55	0.18	0.50	0.90	1.62	1.14	0.22	11.36	13.89	25.24

Table VOC Big Cars 57 Financial Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost		Total Cost	Passenger Cost	Grand Cost
0	5.60	0.28	0.77	0.07	0.11	0.00	0.00	0.79	0.15	7.77	9.65	17.42
5	5.51	0.28	0.84	0.08	0.15	0.00	0.00	0.81	0.16	7.82	9.85	17.67
10	5.42	0.29	0.91	0.08	0.19	0.00	0.00	0.83	0.16	7.87	10.06	17.93
15	5.33	0.29	0.98	0.09	0.23	0.00	0.00	0.85	0.16	7.93	10.27	18.20
20	5.25	0.29	1.05	0.10	0.27	0.00	0.00	0.87	0.17	7.99	10.50	18.49
25	5.17	0.30	1.12	0.11	0.31	0.00	0.00	0.88	0.17	8.05	10.74	18.79
30	5.09	0.30	1.19	0.12	0.35	0.00	0.00	0.91	0.17	8.12	10.99	19.11
35	5.01	0.30	1.26	0.13	0.38	0.00	0.00	0.93	0.18	8.19	11.25	19.44
40	4.93	0.31	1.33	0.14	0.42	0.00	0.00	0.95	0.18	8.26	11.53	19.79
45	4.86	0.31	1.40	0.15	0.46	0.00	0.00	0.97	0.19	8.34	11.82	20.16
50	4.79	0.32	1.47	0.15	0.50	0.00	0.00	1.00	0.19	8.43	12.12	20.54

Table VOC Big Cars 58 Financial Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil	Other Oil	Grease Cost	Spare Parts	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
			Cost	Cost		Cost						
0	5.61	0.29	0.79	0.07	0.11	0.45	0.81	0.82	0.16	9.11	9.99	19.10
5	5.52	0.30	0.86	0.08	0.15	0.45	0.81	0.84	0.16	9.17	10.20	19.37
10	5.44	0.30	0.93	0.09	0.19	0.45	0.81	0.86	0.16	9.22	10.43	19.65
15	5.35	0.30	1.00	0.10	0.23	0.45	0.81	0.88	0.17	9.29	10.66	19.95
20	5.27	0.31	1.07	0.11	0.27	0.45	0.81	0.90	0.17	9.35	10.91	20.26
25	5.19	0.31	1.14	0.12	0.31	0.45	0.81	0.92	0.18	9.42	11.17	20.59
30	5.12	0.31	1.21	0.13	0.35	0.45	0.81	0.94	0.18	9.50	11.44	20.93
35	5.05	0.32	1.28	0.13	0.38	0.45	0.81	0.97	0.18	9.57	11.72	21.29
40	4.98	0.32	1.35	0.14	0.42	0.45	0.81	0.99	0.19	9.66	12.02	21.67
45	4.91	0.33	1.42	0.15	0.46	0.45	0.81	1.02	0.19	9.74	12.33	22.07
50	4.85	0.33	1.49	0.16	0.50	0.45	0.81	1.04	0.20	9.83	12.66	22.50

Table VOC Big Cars 59 Financial Cost of Operation of Big Cars on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.63	0.30	0.81	0.08	0.11	0.90	1.62	0.85	0.16	10.46	10.35	20.81
5	5.54	0.31	0.88	0.09	0.15	0.90	1.62	0.87	0.17	10.52	10.58	21.11
10	5.46	0.31	0.95	0.10	0.19	0.90	1.62	0.89	0.17	10.59	10.83	21.41
15	5.38	0.32	1.02	0.11	0.23	0.90	1.62	0.91	0.17	10.66	11.08	21.74
20	5.30	0.32	1.09	0.11	0.27	0.90	1.62	0.93	0.18	10.73	11.35	22.08
25	5.23	0.32	1.16	0.12	0.31	0.90	1.62	0.96	0.18	10.80	11.63	22.43
30	5.16	0.33	1.23	0.13	0.35	0.90	1.62	0.98	0.19	10.89	11.92	22.81
35	5.09	0.33	1.30	0.14	0.38	0.90	1.62	1.01	0.19	10.97	12.23	23.20
40	5.03	0.34	1.37	0.15	0.42	0.90	1.62	1.03	0.20	11.06	12.55	23.61
45	4.97	0.34	1.44	0.16	0.46	0.90	1.62	1.06	0.20	11.16	12.89	24.05
50	4.91	0.35	1.51	0.17	0.50	0.90	1.62	1.09	0.21	11.26	13.26	24.51

Table VOC Big Cars 60 Financial Cost of Operation of Big Cars on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.55	0.29	0.79	0.07	0.11	0.00	0.00	0.81	0.15	7.77	9.81	17.58
5	5.45	0.30	0.86	0.08	0.15	0.00	0.00	0.83	0.16	7.82	10.02	17.84
10	5.37	0.30	0.93	0.09	0.19	0.00	0.00	0.84	0.16	7.88	10.24	18.11
15	5.28	0.30	1.00	0.10	0.23	0.00	0.00	0.86	0.17	7.93	10.46	18.40
20	5.20	0.31	1.07	0.11	0.27	0.00	0.00	0.88	0.17	8.00	10.70	18.70
25	5.12	0.31	1.14	0.12	0.31	0.00	0.00	0.90	0.17	8.06	10.96	19.02
30	5.04	0.31	1.21	0.13	0.35	0.00	0.00	0.92	0.18	8.13	11.22	19.35
35	4.96	0.32	1.28	0.13	0.38	0.00	0.00	0.95	0.18	8.21	11.49	19.70
40	4.89	0.32	1.35	0.14	0.42	0.00	0.00	0.97	0.19	8.29	11.78	20.07
45	4.82	0.33	1.42	0.15	0.46	0.00	0.00	1.00	0.19	8.37	12.09	20.46
50	4.75	0.33	1.49	0.16	0.50	0.00	0.00	1.02	0.20	8.46	12.41	20.86

Table VOC Big Cars 61
Financial Cost of Operation of Big Cars on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.56	0.31	0.82	0.08	0.11	0.45	0.81	0.84	0.16	9.13	10.16	19.30
5	5.47	0.32	0.89	0.09	0.15	0.45	0.81	0.86	0.16	9.19	10.39	19.58
10	5.38	0.32	0.96	0.10	0.19	0.45	0.81	0.88	0.17	9.25	10.63	19.88
15	5.30	0.32	1.03	0.11	0.23	0.45	0.81	0.90	0.17	9.32	10.87	20.19
20	5.22	0.33	1.10	0.12	0.27	0.45	0.81	0.92	0.18	9.39	11.13	20.52
25	5.15	0.33	1.17	0.13	0.31	0.45	0.81	0.94	0.18	9.46	11.40	20.86
30	5.07	0.34	1.24	0.13	0.35	0.45	0.81	0.96	0.18	9.54	11.69	21.23
35	5.00	0.34	1.31	0.14	0.38	0.45	0.81	0.99	0.19	9.62	11.99	21.61
40	4.94	0.35	1.38	0.15	0.42	0.45	0.81	1.01	0.19	9.71	12.30	22.01
45	4.87	0.35	1.45	0.16	0.46	0.45	0.81	1.04	0.20	9.80	12.63	22.43
50	4.81	0.36	1.52	0.17	0.50	0.45	0.81	1.07	0.20	9.89	12.99	22.88

Table VOC Big Cars 62
Financial Cost of Operation of Big Cars on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	100	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.57	0.33	0.85	0.09	0.11	0.90	1.62	0.87	0.17	10.51	10.55	21.06
5	5.49	0.34	0.92	0.10	0.15	0.90	1.62	0.89	0.17	10.58	10.79	21.37
10	5.41	0.34	0.99	0.11	0.19	0.90	1.62	0.91	0.17	10.64	11.05	21.69
15	5.33	0.35	1.06	0.12	0.23	0.90	1.62	0.93	0.18	10.72	11.31	22.03
20	5.26	0.35	1.13	0.13	0.27	0.90	1.62	0.96	0.18	10.79	11.59	22.39
25	5.19	0.36	1.20	0.14	0.31	0.90	1.62	0.98	0.19	10.87	11.89	22.76
30	5.12	0.36	1.27	0.14	0.35	0.90	1.62	1.00	0.19	10.96	12.20	23.16
35	5.05	0.37	1.34	0.15	0.38	0.90	1.62	1.03	0.20	11.05	12.52	23.57
40	4.99	0.37	1.41	0.16	0.42	0.90	1.62	1.06	0.20	11.15	12.87	24.01
45	4.93	0.38	1.48	0.17	0.46	0.90	1.62	1.09	0.21	11.25	13.23	24.48
50	4.88	0.39	1.55	0.18	0.50	0.90	1.62	1.12	0.21	11.35	13.62	24.97

Table VOC Big Cars 63
Financial Cost of Operation of Big Cars on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.64	0.28	0.77	0.07	0.11	0.00	0.00	0.79	0.15	7.80	9.55	17.35
5	5.54	0.28	0.84	0.08	0.15	0.00	0.00	0.80	0.15	7.84	9.75	17.60
10	5.45	0.29	0.91	0.08	0.19	0.00	0.00	0.82	0.16	7.90	9.96	17.85
15	5.36	0.29	0.98	0.09	0.23	0.00	0.00	0.84	0.16	7.95	10.18	18.12
20	5.28	0.29	1.05	0.10	0.27	0.00	0.00	0.86	0.16	8.01	10.40	18.41
25	5.19	0.30	1.12	0.11	0.31	0.00	0.00	0.88	0.17	8.07	10.64	18.71
30	5.11	0.30	1.19	0.12	0.35	0.00	0.00	0.90	0.17	8.13	10.89	19.02
35	5.03	0.30	1.26	0.13	0.38	0.00	0.00	0.92	0.18	8.20	11.15	19.35
40	4.95	0.31	1.33	0.14	0.42	0.00	0.00	0.94	0.18	8.27	11.42	19.69
45	4.88	0.31	1.40	0.15	0.46	0.00	0.00	0.96	0.18	8.35	11.70	20.05
50	4.81	0.32	1.47	0.15	0.50	0.00	0.00	0.99	0.19	8.43	12.00	20.44

Table VOC Big Cars 64 Financial Cost of Operation of Big Cars on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.64	0.29	0.79	0.07	0.11	0.45	0.81	0.81	0.16	9.13	9.89	19.03
5	5.55	0.30	0.86	0.08	0.15	0.45	0.81	0.83	0.16	9.19	10.10	19.29
10	5.46	0.30	0.93	0.09	0.19	0.45	0.81	0.85	0.16	9.24	10.33	19.57
15	5.38	0.30	1.00	0.10	0.23	0.45	0.81	0.87	0.17	9.30	10.56	19.86
20	5.30	0.31	1.07	0.11	0.27	0.45	0.81	0.89	0.17	9.37	10.81	20.17
25	5.22	0.31	1.14	0.12	0.31	0.45	0.81	0.91	0.17	9.43	11.06	20.49
30	5.14	0.31	1.21	0.13	0.35	0.45	0.81	0.93	0.18	9.51	11.33	20.83
35	5.07	0.32	1.28	0.13	0.38	0.45	0.81	0.96	0.18	9.58	11.61	21.19
40	4.99	0.32	1.35	0.14	0.42	0.45	0.81	0.98	0.19	9.66	11.90	21.57
45	4.93	0.33	1.42	0.15	0.46	0.45	0.81	1.01	0.19	9.75	12.22	21.96
50	4.86	0.33	1.49	0.16	0.50	0.45	0.81	1.03	0.20	9.84	12.54	22.38

Table VOC Big Cars 65
Financial Cost of Operation of Big Cars on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.65	0.30	0.81	0.08	0.11	0.90	1.62	0.84	0.16	10.48	10.25	20.74
5	5.57	0.31	0.88	0.09	0.15	0.90	1.62	0.86	0.17	10.54	10.48	21.02
10	5.48	0.31	0.95	0.10	0.19	0.90	1.62	0.88	0.17	10.60	10.72	21.33
15	5.40	0.32	1.02	0.11	0.23	0.90	1.62	0.90	0.17	10.67	10.98	21.65
20	5.33	0.32	1.09	0.11	0.27	0.90	1.62	0.93	0.18	10.74	11.24	21.98
25	5.25	0.32	1.16	0.12	0.31	0.90	1.62	0.95	0.18	10.81	11.52	22.33
30	5.18	0.33	1.23	0.13	0.35	0.90	1.62	0.97	0.19	10.89	11.81	22.70
35	5.11	0.33	1.30	0.14	0.38	0.90	1.62	1.00	0.19	10.98	12.11	23.09
40	5.04	0.34	1.37	0.15	0.42	0.90	1.62	1.02	0.20	11.06	12.44	23.50
45	4.98	0.34	1.44	0.16	0.46	0.90	1.62	1.05	0.20	11.16	12.77	23.93
50	4.92	0.35	1.51	0.17	0.50	0.90	1.62	1.08	0.21	11.26	13.13	24.39

Table VOC Big Cars 66 Financial Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.73	0.27	0.75	0.06	0.11	0.00	0.00	0.77	0.15	7.85	9.31	17.16
5	5.64	0.28	0.83	0.07	0.15	0.00	0.00	0.78	0.15	7.89	9.50	17.39
10	5.54	0.28	0.90	0.08	0.19	0.00	0.00	0.80	0.15	7.94	9.70	17.64
15	5.45	0.28	0.97	0.09	0.23	0.00	0.00	0.82	0.16	7.99	9.90	17.89
20	5.36	0.29	1.04	0.10	0.27	0.00	0.00	0.83	0.16	8.04	10.12	18.16
25	5.27	0.29	1.11	0.11	0.31	0.00	0.00	0.85	0.16	8.10	10.34	18.44
30	5.19	0.29	1.18	0.12	0.35	0.00	0.00	0.87	0.17	8.16	10.57	18.73
35	5.10	0.30	1.25	0.13	0.38	0.00	0.00	0.89	0.17	8.22	10.82	19.04
40	5.03	0.30	1.32	0.13	0.42	0.00	0.00	0.91	0.17	8.29	11.07	19.36
45	4.95	0.31	1.39	0.14	0.46	0.00	0.00	0.93	0.18	8.36	11.34	19.70
50	4.87	0.31	1.46	0.15	0.50	0.00	0.00	0.96	0.18	8.44	11.62	20.06

Table VOC Big Cars 67
Financial Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.73	0.28	0.77	0.07	0.11	0.45	0.81	0.79	0.15	9.17	9.63	18.80
5	5.64	0.29	0.84	0.08	0.15	0.45	0.81	0.81	0.16	9.22	9.84	19.05
10	5.55	0.29	0.91	0.09	0.19	0.45	0.81	0.83	0.16	9.27	10.05	19.32
15	5.46	0.29	0.98	0.10	0.23	0.45	0.81	0.85	0.16	9.33	10.27	19.59
20	5.38	0.30	1.05	0.10	0.27	0.45	0.81	0.86	0.17	9.38	10.50	19.88
25	5.29	0.30	1.12	0.11	0.31	0.45	0.81	0.88	0.17	9.45	10.74	20.19
30	5.21	0.30	1.19	0.12	0.35	0.45	0.81	0.91	0.17	9.51	10.99	20.50
35	5.13	0.31	1.26	0.13	0.38	0.45	0.81	0.93	0.18	9.58	11.25	20.84
40	5.06	0.31	1.33	0.14	0.42	0.45	0.81	0.95	0.18	9.66	11.53	21.19
45	4.99	0.32	1.40	0.15	0.46	0.45	0.81	0.97	0.19	9.74	11.82	21.56
50	4.92	0.32	1.47	0.16	0.50	0.45	0.81	1.00	0.19	9.82	12.13	21.95

Table VOC Big Cars 68
Financial Cost of Operation of Big Cars on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	5.74	0.29	0.79	0.07	0.11	0.90	1.62	0.82	0.16	10.50	9.98	20.48
5	5.65	0.30	0.86	0.08	0.15	0.90	1.62	0.84	0.16	10.55	10.19	20.75
10	5.56	0.30	0.93	0.09	0.19	0.90	1.62	0.86	0.16	10.61	10.42	21.03
15	5.48	0.30	1.00	0.10	0.23	0.90	1.62	0.88	0.17	10.67	10.66	21.33
20	5.40	0.31	1.07	0.11	0.27	0.90	1.62	0.90	0.17	10.74	10.91	21.65
25	5.32	0.31	1.14	0.12	0.31	0.90	1.62	0.92	0.18	10.81	11.17	21.98
30	5.24	0.31	1.21	0.13	0.35	0.90	1.62	0.94	0.18	10.88	11.44	22.32
35	5.17	0.32	1.28	0.13	0.38	0.90	1.62	0.97	0.18	10.96	11.73	22.69
40	5.10	0.32	1.35	0.14	0.42	0.90	1.62	0.99	0.19	11.04	12.03	23.07
45	5.03	0.33	1.42	0.15	0.46	0.90	1.62	1.02	0.19	11.13	12.35	23.47
50	4.97	0.33	1.49	0.16	0.50	0.90	1.62	1.04	0.20	11.22	12.68	23.90

Table VOC Two Wheelers 1 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost			Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.71	0.07	0.02	0.04	0.05	0.00	0.00	0.28	0.05	1.23	1.21	2.44
5	0.70	0.07	0.03	0.05	0.07	0.00	0.00	0.30	0.05	1.28	1.30	2.58
10	0.70	0.07	0.03	0.05	0.09	0.00	0.00	0.33	0.06	1.33	1.40	2.73
15	0.71	0.08	0.04	0.06	0.11	0.00	0.00	0.35	0.06	1.40	1.51	2.91
20	0.72	0.08	0.05	0.06	0.13	0.00	0.00	0.38	0.07	1.48	1.64	3.13
25	0.74	0.08	0.06	0.07	0.14	0.00	0.00	0.42	0.07	1.58	1.80	3.38
30	0.78	0.08	0.06	0.07	0.16	0.00	0.00	0.47	0.08	1.70	2.00	3.70
35	0.82	0.08	0.07	0.07	0.18	0.00	0.00	0.52	0.09	1.84	2.24	4.08
40	0.89	0.08	0.08	0.08	0.20	0.00	0.00	0.59	0.10	2.02	2.55	4.57
45	0.98	0.08	0.09	0.08	0.22	0.00	0.00	0.69	0.12	2.25	2.95	5.20
50	1.10	0.08	0.09	0.09	0.24	0.00	0.00	0.82	0.14	2.57	3.51	6.07

Table VOC Two Wheelers 2 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.69	0.08	0.03	0.05	0.05	0.06	0.03	0.30	0.05	1.35	1.28	2.63
5	0.69	0.08	0.03	0.06	0.07	0.06	0.03	0.32	0.06	1.40	1.38	2.78
10	0.70	0.09	0.04	0.06	0.09	0.06	0.03	0.35	0.06	1.47	1.49	2.96
15	0.71	0.09	0.05	0.07	0.11	0.06	0.03	0.38	0.07	1.55	1.62	3.17
20	0.73	0.09	0.06	0.07	0.13	0.06	0.03	0.41	0.07	1.64	1.77	3.42
25	0.76	0.09	0.06	0.07	0.14	0.06	0.03	0.46	0.08	1.76	1.96	3.72
30	0.81	0.09	0.07	0.08	0.16	0.06	0.03	0.51	0.09	1.89	2.19	4.09
35	0.87	0.09	0.08	0.08	0.18	0.06	0.03	0.58	0.10	2.07	2.49	4.56
40	0.95	0.09	0.09	0.09	0.20	0.06	0.03	0.67	0.12	2.29	2.87	5.16
45	1.07	0.10	0.09	0.09	0.22	0.06	0.03	0.79	0.14	2.59	3.40	5.99
50	1.25	0.10	0.10	0.10	0.24	0.06	0.03	0.97	0.17	3.00	4.16	7.17

Table VOC Two Wheelers 3 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.69	0.10	0.03	0.06	0.05	0.14	0.08	0.32	0.06	1.51	1.36	2.88
5	0.69	0.10	0.04	0.07	0.07	0.14	0.08	0.34	0.06	1.58	1.47	3.05
10	0.70	0.10	0.05	0.07	0.09	0.14	0.08	0.37	0.07	1.66	1.60	3.25
15	0.72	0.10	0.05	0.07	0.11	0.14	0.08	0.41	0.07	1.75	1.75	3.49
20	0.75	0.11	0.06	0.08	0.13	0.14	0.08	0.45	0.08	1.86	1.93	3.79
25	0.79	0.11	0.07	0.08	0.14	0.14	80.0	0.50	0.09	1.99	2.15	4.14
30	0.85	0.11	0.08	0.09	0.16	0.14	0.08	0.57	0.10	2.16	2.43	4.59
35	0.93	0.11	0.08	0.09	0.18	0.14	0.08	0.65	0.11	2.37	2.80	5.17
40	1.04	0.11	0.09	0.10	0.20	0.14	0.08	0.77	0.13	2.66	3.30	5.95
45	1.20	0.12	0.10	0.10	0.22	0.14	0.08	0.93	0.16	3.05	4.01	7.06
50	1.46	0.12	0.11	0.10	0.24	0.14	0.08	1.19	0.21	3.64	5.12	8.76

Table VOC Two Wheelers 4 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.68	0.12	0.04	0.07	0.05	0.22	0.12	0.34	0.06	1.70	1.45	3.15
5	0.69	0.12	0.05	0.07	0.07	0.22	0.12	0.37	0.06	1.77	1.57	3.34
10	0.71	0.12	0.05	0.08	0.09	0.22	0.12	0.40	0.07	1.86	1.72	3.58
15	0.73	0.13	0.06	0.08	0.11	0.22	0.12	0.44	0.08	1.97	1.89	3.86
20	0.77	0.13	0.07	0.09	0.13	0.22	0.12	0.49	0.09	2.10	2.11	4.21
25	0.83	0.13	0.08	0.09	0.14	0.22	0.12	0.55	0.10	2.26	2.38	4.64
30	0.90	0.14	0.08	0.10	0.16	0.22	0.12	0.64	0.11	2.47	2.73	5.20
35	1.01	0.14	0.09	0.10	0.18	0.22	0.12	0.75	0.13	2.74	3.20	5.94
40	1.16	0.14	0.10	0.10	0.20	0.22	0.12	0.90	0.16	3.11	3.87	6.98
45	1.40	0.15	0.11	0.11	0.22	0.22	0.12	1.14	0.20	3.66	4.89	8.55
50	1.81	0.15	0.11	0.11	0.24	0.22	0.12	1.55	0.27	4.58	6.63	11.22

Table VOC Two Wheelers 5 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 6000

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.68	0.15	0.05	0.08	0.05	0.30	0.17	0.36	0.06	1.90	1.55	3.45
5	0.70	0.16	0.05	0.08	0.07	0.30	0.17	0.39	0.07	1.99	1.69	3.68
10	0.72	0.16	0.06	0.09	0.09	0.30	0.17	0.43	0.08	2.09	1.86	3.95
15	0.76	0.17	0.07	0.09	0.11	0.30	0.17	0.48	0.08	2.22	2.07	4.29
20	0.81	0.17	0.07	0.09	0.13	0.30	0.17	0.54	0.10	2.38	2.33	4.71
25	0.88	0.18	0.08	0.10	0.14	0.30	0.17	0.62	0.11	2.58	2.66	5.24
30	0.98	0.18	0.09	0.10	0.16	0.30	0.17	0.72	0.13	2.84	3.11	5.95
35	1.13	0.19	0.10	0.11	0.18	0.30	0.17	0.87	0.15	3.19	3.74	6.93
40	1.35	0.20	0.10	0.11	0.20	0.30	0.17	1.09	0.19	3.70	4.68	8.38
45	1.71	0.20	0.11	0.12	0.22	0.30	0.17	1.46	0.26	4.54	6.26	10.80
50	2.45	0.21	0.12	0.12	0.24	0.30	0.17	2.20	0.38	6.19	9.44	15.63

Table VOC Two Wheelers 6 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.68	0.21	0.05	0.09	0.05	0.38	0.21	0.39	0.07	2.13	1.67	3.80
5	0.71	0.22	0.06	0.09	0.07	0.38	0.21	0.43	0.07	2.24	1.83	4.07
10	0.74	0.23	0.07	0.09	0.09	0.38	0.21	0.47	0.08	2.37	2.03	4.40
15	0.79	0.24	0.07	0.10	0.11	0.38	0.21	0.53	0.09	2.53	2.28	4.81
20	0.86	0.25	0.08	0.10	0.13	0.38	0.21	0.61	0.11	2.72	2.60	5.32
25	0.95	0.26	0.09	0.11	0.14	0.38	0.21	0.70	0.12	2.97	3.02	6.00
30	1.09	0.27	0.10	0.11	0.16	0.38	0.21	0.84	0.15	3.31	3.61	6.93
35	1.29	0.29	0.10	0.12	0.18	0.38	0.21	1.04	0.18	3.80	4.49	8.29
40	1.63	0.30	0.11	0.12	0.20	0.38	0.21	1.38	0.24	4.57	5.92	10.49
45	2.27	0.32	0.12	0.12	0.22	0.38	0.21	2.02	0.35	6.03	8.69	14.71
50	4.04	0.34	0.13	0.13	0.24	0.38	0.21	3.81	0.67	9.94	16.34	26.28

Table VOC Two Wheelers 7 Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.70	0.33	0.06	0.09	0.05	0.47	0.26	0.42	0.07	2.45	1.80	4.25
5	0.73	0.36	0.07	0.10	0.07	0.47	0.26	0.46	0.08	2.59	1.99	4.58
10	0.77	0.38	0.07	0.10	0.09	0.47	0.26	0.52	0.09	2.75	2.23	4.99
15	0.84	0.41	0.08	0.11	0.11	0.47	0.26	0.59	0.10	2.96	2.54	5.50
20	0.93	0.45	0.09	0.11	0.13	0.47	0.26	0.69	0.12	3.23	2.94	6.17
25	1.05	0.49	0.09	0.12	0.14	0.47	0.26	0.81	0.14	3.58	3.50	7.07
30	1.24	0.54	0.10	0.12	0.16	0.47	0.26	1.00	0.18	4.07	4.31	8.38
35	1.55	0.60	0.11	0.12	0.18	0.47	0.26	1.31	0.23	4.82	5.61	10.43
40	2.12	0.67	0.12	0.13	0.20	0.47	0.26	1.87	0.33	6.16	8.05	14.21
45	3.54	0.77	0.12	0.13	0.22	0.47	0.26	3.31	0.58	9.40	14.22	23.62
50	14.27	0.90	0.13	0.14	0.24	0.47	0.26	14.16	2.48	33.04	60.81	93.84

Table VOC Two Wheelers 8 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.76	0.07	0.02	0.04	0.05	0.00	0.00	0.25	0.04	1.23	1.09	2.32
5	0.74	0.07	0.02	0.04	0.07	0.00	0.00	0.27	0.05	1.26	1.16	2.43
10	0.73	0.07	0.03	0.05	0.09	0.00	0.00	0.29	0.05	1.31	1.25	2.55
15	0.73	0.07	0.04	0.05	0.11	0.00	0.00	0.31	0.05	1.36	1.34	2.70
20	0.73	0.07	0.05	0.06	0.13	0.00	0.00	0.34	0.06	1.42	1.45	2.87
25	0.74	0.07	0.05	0.06	0.14	0.00	0.00	0.37	0.06	1.50	1.58	3.08
30	0.75	0.07	0.06	0.06	0.16	0.00	0.00	0.40	0.07	1.59	1.74	3.33
35	0.78	0.07	0.07	0.07	0.18	0.00	0.00	0.45	0.08	1.70	1.93	3.63
40	0.83	0.07	0.08	0.07	0.20	0.00	0.00	0.50	0.09	1.84	2.16	4.01
45	0.89	0.08	0.08	0.08	0.22	0.00	0.00	0.57	0.10	2.02	2.47	4.49
50	0.98	0.08	0.09	0.08	0.24	0.00	0.00	0.67	0.12	2.25	2.87	5.12

Table VOC Two Wheelers 9 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.74	0.07	0.02	0.04	0.05	0.06	0.03	0.26	0.05	1.33	1.13	2.46
5	0.73	0.07	0.03	0.05	0.07	0.06	0.03	0.28	0.05	1.37	1.21	2.58
10	0.72	0.07	0.04	0.05	0.09	0.06	0.03	0.30	0.05	1.42	1.30	2.72
15	0.72	0.08	0.04	0.06	0.11	0.06	0.03	0.33	0.06	1.47	1.41	2.88
20	0.73	0.08	0.05	0.06	0.13	0.06	0.03	0.36	0.06	1.55	1.53	3.07
25	0.74	0.08	0.06	0.07	0.14	0.06	0.03	0.39	0.07	1.63	1.67	3.30
30	0.77	0.08	0.06	0.07	0.16	0.06	0.03	0.43	0.08	1.74	1.85	3.58
35	0.80	0.08	0.07	0.07	0.18	0.06	0.03	0.48	0.08	1.86	2.07	3.93
40	0.86	0.08	0.08	0.08	0.20	0.06	0.03	0.55	0.10	2.02	2.34	4.36
45	0.93	0.08	0.09	0.08	0.22	0.06	0.03	0.63	0.11	2.23	2.70	4.93
50	1.04	0.08	0.09	0.09	0.24	0.06	0.03	0.74	0.13	2.50	3.19	5.69

Table VOC Two Wheelers 10 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.73	0.08	0.02	0.05	0.05	0.14	0.08	0.27	0.05	1.47	1.18	2.65
5	0.72	0.08	0.03	0.05	0.07	0.14	0.08	0.29	0.05	1.52	1.27	2.78
10	0.72	0.08	0.04	0.06	0.09	0.14	0.08	0.32	0.06	1.57	1.36	2.93
15	0.72	0.08	0.05	0.06	0.11	0.14	0.08	0.34	0.06	1.64	1.48	3.12
20	0.73	0.08	0.05	0.07	0.13	0.14	0.08	0.38	0.07	1.72	1.61	3.33
25	0.75	0.09	0.06	0.07	0.14	0.14	0.08	0.41	0.07	1.81	1.78	3.59
30	0.78	0.09	0.07	0.08	0.16	0.14	0.08	0.46	0.08	1.93	1.98	3.91
35	0.83	0.09	0.08	0.08	0.18	0.14	0.08	0.52	0.09	2.08	2.23	4.30
40	0.90	0.09	0.08	0.08	0.20	0.14	0.08	0.59	0.10	2.27	2.55	4.81
45	0.99	0.09	0.09	0.09	0.22	0.14	0.08	0.69	0.12	2.51	2.98	5.49
50	1.13	0.09	0.10	0.09	0.24	0.14	0.08	0.84	0.15	2.85	3.59	6.43

Table VOC Two Wheelers 11 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.72	0.09	0.03	0.06	0.05	0.22	0.12	0.29	0.05	1.62	1.23	2.85
5	0.71	0.09	0.04	0.06	0.07	0.22	0.12	0.31	0.05	1.67	1.32	3.00
10	0.71	0.09	0.04	0.06	0.09	0.22	0.12	0.33	0.06	1.73	1.43	3.16
15	0.72	0.09	0.05	0.07	0.11	0.22	0.12	0.36	0.06	1.81	1.56	3.37
20	0.74	0.09	0.06	0.07	0.13	0.22	0.12	0.40	0.07	1.90	1.71	3.61
25	0.77	0.10	0.07	0.08	0.14	0.22	0.12	0.44	80.0	2.01	1.89	3.90
30	0.81	0.10	0.07	0.08	0.16	0.22	0.12	0.49	0.09	2.14	2.12	4.26
35	0.86	0.10	0.08	0.09	0.18	0.22	0.12	0.56	0.10	2.31	2.41	4.72
40	0.95	0.10	0.09	0.09	0.20	0.22	0.12	0.65	0.11	2.53	2.79	5.33
45	1.07	0.10	0.10	0.09	0.22	0.22	0.12	0.77	0.14	2.83	3.32	6.15
50	1.24	0.11	0.10	0.10	0.24	0.22	0.12	0.95	0.17	3.25	4.10	7.35

Table VOC Two Wheelers 12 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.71	0.10	0.03	0.06	0.05	0.30	0.17	0.30	0.05	1.78	1.29	3.06
5	0.71	0.10	0.04	0.07	0.07	0.30	0.17	0.32	0.06	1.83	1.39	3.22
10	0.71	0.10	0.05	0.07	0.09	0.30	0.17	0.35	0.06	1.90	1.51	3.41
15	0.73	0.11	0.06	0.07	0.11	0.30	0.17	0.38	0.07	1.99	1.65	3.63
20	0.75	0.11	0.06	0.08	0.13	0.30	0.17	0.42	0.07	2.09	1.82	3.91
25	0.78	0.11	0.07	0.08	0.14	0.30	0.17	0.47	0.08	2.21	2.03	4.24
30	0.83	0.11	0.08	0.09	0.16	0.30	0.17	0.53	0.09	2.37	2.29	4.66
35	0.91	0.11	0.09	0.09	0.18	0.30	0.17	0.61	0.11	2.57	2.63	5.20
40	1.01	0.12	0.09	0.10	0.20	0.30	0.17	0.72	0.13	2.83	3.10	5.92
45	1.16	0.12	0.10	0.10	0.22	0.30	0.17	0.87	0.15	3.19	3.76	6.95
50	1.40	0.12	0.11	0.10	0.24	0.30	0.17	1.11	0.19	3.74	4.78	8.52

Table VOC Two Wheelers 13
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	0.70	0.11	0.04	0.07	0.05	0.38	0.21	0.31	0.05	1.94	1.35	3.28
5	0.71	0.12	0.04	0.07	0.07	0.38	0.21	0.34	0.06	2.00	1.46	3.46
10	0.72	0.12	0.05	0.08	0.09	0.38	0.21	0.37	0.06	2.08	1.59	3.67
15	0.73	0.12	0.06	0.08	0.11	0.38	0.21	0.41	0.07	2.18	1.75	3.92
20	0.76	0.12	0.07	0.08	0.13	0.38	0.21	0.45	0.08	2.29	1.94	4.23
25	0.81	0.13	0.07	0.09	0.14	0.38	0.21	0.51	0.09	2.43	2.18	4.61
30	0.87	0.13	0.08	0.09	0.16	0.38	0.21	0.58	0.10	2.61	2.49	5.10
35	0.96	0.13	0.09	0.10	0.18	0.38	0.21	0.67	0.12	2.85	2.90	5.75
40	1.09	0.14	0.10	0.10	0.20	0.38	0.21	0.81	0.14	3.17	3.47	6.64
45	1.29	0.14	0.10	0.11	0.22	0.38	0.21	1.01	0.18	3.63	4.32	7.95
50	1.62	0.14	0.11	0.11	0.24	0.38	0.21	1.33	0.23	4.38	5.73	10.10

Table VOC Two Wheelers 14 Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.70	0.13	0.04	0.07	0.05	0.47	0.26	0.33	0.06	2.11	1.41	3.52
5	0.71	0.13	0.05	0.08	0.07	0.47	0.26	0.36	0.06	2.18	1.54	3.72
10	0.72	0.14	0.06	0.08	0.09	0.47	0.26	0.39	0.07	2.27	1.68	3.95
15	0.75	0.14	0.06	0.09	0.11	0.47	0.26	0.43	0.08	2.38	1.86	4.24
20	0.79	0.15	0.07	0.09	0.13	0.47	0.26	0.48	0.08	2.51	2.08	4.59
25	0.84	0.15	0.08	0.09	0.14	0.47	0.26	0.55	0.10	2.67	2.36	5.03
30	0.92	0.15	0.09	0.10	0.16	0.47	0.26	0.63	0.11	2.89	2.72	5.61
35	1.03	0.16	0.09	0.10	0.18	0.47	0.26	0.75	0.13	3.17	3.22	6.39
40	1.20	0.16	0.10	0.11	0.20	0.47	0.26	0.92	0.16	3.57	3.94	7.51
45	1.46	0.17	0.11	0.11	0.22	0.47	0.26	1.18	0.21	4.18	5.08	9.26
50	1.94	0.17	0.12	0.12	0.24	0.47	0.26	1.66	0.29	5.26	7.15	12.41

Table VOC Two Wheelers 15 Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.77	0.06	0.01	0.04	0.05	0.00	0.00	0.25	0.04	1.23	1.53	2.76
5	0.75	0.07	0.02	0.04	0.07	0.00	0.00	0.27	0.05	1.26	1.64	2.90
10	0.73	0.07	0.03	0.04	0.09	0.00	0.00	0.29	0.05	1.30	1.77	3.07
15	0.73	0.07	0.04	0.05	0.11	0.00	0.00	0.31	0.05	1.35	1.91	3.27
20	0.73	0.07	0.04	0.05	0.13	0.00	0.00	0.34	0.06	1.42	2.09	3.50
25	0.74	0.07	0.05	0.06	0.14	0.00	0.00	0.37	0.07	1.50	2.29	3.79
30	0.76	0.07	0.06	0.06	0.16	0.00	0.00	0.42	0.07	1.60	2.54	4.14
35	0.79	0.07	0.07	0.07	0.18	0.00	0.00	0.47	0.08	1.72	2.85	4.58
40	0.84	0.07	0.07	0.07	0.20	0.00	0.00	0.53	0.09	1.88	3.25	5.14
45	0.92	0.07	0.08	0.08	0.22	0.00	0.00	0.62	0.11	2.09	3.79	5.88
50	1.04	0.07	0.09	0.08	0.24	0.00	0.00	0.74	0.13	2.38	4.52	6.90

Table VOC Two Wheelers 16 Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	0.75	0.07	0.02	0.04	0.05	0.06	0.03	0.26	0.05	1.32	1.58	2.91
5	0.74	0.07	0.03	0.05	0.07	0.06	0.03	0.28	0.05	1.36	1.70	3.06
10	0.73	0.07	0.03	0.05	0.09	0.06	0.03	0.30	0.05	1.40	1.83	3.24
15	0.72	0.07	0.04	0.05	0.11	0.06	0.03	0.33	0.06	1.46	1.99	3.45
20	0.73	0.07	0.05	0.06	0.13	0.06	0.03	0.36	0.06	1.53	2.18	3.71
25	0.74	0.07	0.05	0.06	0.14	0.06	0.03	0.39	0.07	1.62	2.40	4.03
30	0.77	0.07	0.06	0.07	0.16	0.06	0.03	0.44	0.08	1.74	2.68	4.42
35	0.81	0.08	0.07	0.07	0.18	0.06	0.03	0.50	0.09	1.88	3.03	4.91
40	0.87	0.08	0.08	0.08	0.20	0.06	0.03	0.57	0.10	2.06	3.49	5.55
45	0.97	0.08	0.08	0.08	0.22	0.06	0.03	0.67	0.12	2.30	4.11	6.41
50	1.11	0.08	0.09	0.08	0.24	0.06	0.03	0.81	0.14	2.64	4.99	7.63

Table VOC Two Wheelers 17 Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.74	0.07	0.02	0.05	0.05	0.14	0.08	0.27	0.05	1.46	1.64	3.10
5	0.73	0.07	0.03	0.05	0.07	0.14	0.08	0.29	0.05	1.50	1.76	3.26
10	0.72	0.08	0.04	0.05	0.09	0.14	0.08	0.31	0.05	1.55	1.91	3.46
15	0.72	0.08	0.04	0.06	0.11	0.14	0.08	0.34	0.06	1.62	2.08	3.70
20	0.73	0.08	0.05	0.06	0.13	0.14	0.08	0.37	0.07	1.70	2.28	3.98
25	0.75	0.08	0.06	0.07	0.14	0.14	0.08	0.41	0.07	1.80	2.53	4.33
30	0.79	0.08	0.07	0.07	0.16	0.14	0.08	0.46	0.08	1.92	2.84	4.76
35	0.84	0.08	0.07	0.08	0.18	0.14	0.08	0.53	0.09	2.08	3.24	5.32
40	0.91	0.08	0.08	0.08	0.20	0.14	0.08	0.61	0.11	2.29	3.76	6.05
45	1.02	0.08	0.09	0.08	0.22	0.14	0.08	0.73	0.13	2.57	4.49	7.06
50	1.20	0.09	0.10	0.09	0.24	0.14	0.08	0.91	0.16	2.98	5.56	8.54

Table VOC Two Wheelers 18 Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.73	0.08	0.02	0.05	0.05	0.22	0.12	0.28	0.05	1.60	1.69	3.30
5	0.72	0.08	0.03	0.05	0.07	0.22	0.12	0.30	0.05	1.65	1.83	3.48
10	0.72	0.08	0.04	0.06	0.09	0.22	0.12	0.32	0.06	1.71	1.98	3.69
15	0.72	0.08	0.05	0.06	0.11	0.22	0.12	0.35	0.06	1.78	2.17	3.95
20	0.74	0.08	0.05	0.07	0.13	0.22	0.12	0.39	0.07	1.87	2.39	4.26
25	0.76	0.09	0.06	0.07	0.14	0.22	0.12	0.44	0.08	1.98	2.67	4.65
30	0.81	0.09	0.07	0.08	0.16	0.22	0.12	0.49	0.09	2.12	3.02	5.13
35	0.87	0.09	0.08	0.08	0.18	0.22	0.12	0.57	0.10	2.30	3.47	5.77
40	0.96	0.09	0.08	0.08	0.20	0.22	0.12	0.67	0.12	2.54	4.08	6.61
45	1.10	0.09	0.09	0.09	0.22	0.22	0.12	0.81	0.14	2.87	4.94	7.82
50	1.31	0.09	0.10	0.09	0.24	0.22	0.12	1.03	0.18	3.38	6.28	9.66

Table VOC Two Wheelers 19 Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.72	0.09	0.03	0.05	0.05	0.30	0.17	0.29	0.05	1.75	1.76	3.50
5	0.72	0.09	0.04	0.06	0.07	0.30	0.17	0.31	0.05	1.80	1.90	3.70
10	0.72	0.09	0.04	0.06	0.09	0.30	0.17	0.34	0.06	1.86	2.07	3.93
15	0.73	0.09	0.05	0.07	0.11	0.30	0.17	0.37	0.06	1.94	2.27	4.22
20	0.75	0.09	0.06	0.07	0.13	0.30	0.17	0.41	0.07	2.04	2.52	4.56
25	0.78	0.09	0.06	0.08	0.14	0.30	0.17	0.46	0.08	2.17	2.83	4.99
30	0.83	0.10	0.07	0.08	0.16	0.30	0.17	0.53	0.09	2.32	3.22	5.54
35	0.90	0.10	0.08	0.08	0.18	0.30	0.17	0.61	0.11	2.53	3.73	6.26
40	1.01	0.10	0.09	0.09	0.20	0.30	0.17	0.73	0.13	2.81	4.45	7.26
45	1.18	0.10	0.09	0.09	0.22	0.30	0.17	0.90	0.16	3.21	5.51	8.72
50	1.46	0.10	0.10	0.10	0.24	0.30	0.17	1.18	0.21	3.85	7.22	11.07

Table VOC Two Wheelers 20 Economic Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.96	0.06	0.01	0.04	0.05	0.00	0.00	0.20	0.03	1.36	1.23	2.59
5	0.92	0.07	0.02	0.04	0.07	0.00	0.00	0.21	0.04	1.37	1.29	2.66
10	0.89	0.07	0.03	0.04	0.09	0.00	0.00	0.22	0.04	1.38	1.36	2.74
15	0.86	0.07	0.04	0.05	0.11	0.00	0.00	0.23	0.04	1.39	1.44	2.83
20	0.84	0.07	0.04	0.05	0.13	0.00	0.00	0.25	0.04	1.42	1.52	2.94
25	0.82	0.07	0.05	0.06	0.14	0.00	0.00	0.26	0.05	1.45	1.62	3.07
30	0.81	0.07	0.06	0.06	0.16	0.00	0.00	0.28	0.05	1.49	1.73	3.21
35	0.80	0.07	0.07	0.07	0.18	0.00	0.00	0.30	0.05	1.53	1.85	3.39
40	0.80	0.07	0.07	0.07	0.20	0.00	0.00	0.32	0.06	1.59	2.00	3.59
45	0.80	0.07	0.08	0.08	0.22	0.00	0.00	0.35	0.06	1.66	2.17	3.83
50	0.81	0.07	0.09	0.08	0.24	0.00	0.00	0.38	0.07	1.74	2.37	4.11

Table VOC Two Wheelers 21 Economic Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	.,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.94	0.07	0.02	0.04	0.05	0.06	0.03	0.20	0.04	1.44	1.26	2.70
5	0.90	0.07	0.03	0.05	0.07	0.06	0.03	0.21	0.04	1.45	1.32	2.77
10	0.87	0.07	0.03	0.05	0.09	0.06	0.03	0.23	0.04	1.47	1.39	2.86
15	0.85	0.07	0.04	0.05	0.11	0.06	0.03	0.24	0.04	1.49	1.47	2.96
20	0.83	0.07	0.05	0.06	0.13	0.06	0.03	0.25	0.04	1.51	1.57	3.08
25	0.81	0.07	0.05	0.06	0.14	0.06	0.03	0.27	0.05	1.55	1.67	3.22
30	0.80	0.07	0.06	0.07	0.16	0.06	0.03	0.29	0.05	1.59	1.78	3.37
35	0.79	0.08	0.07	0.07	0.18	0.06	0.03	0.31	0.05	1.64	1.92	3.56
40	0.80	0.08	0.08	0.08	0.20	0.06	0.03	0.34	0.06	1.70	2.07	3.78
45	0.80	0.08	0.08	0.08	0.22	0.06	0.03	0.37	0.06	1.78	2.26	4.04
50	0.82	0.08	0.09	0.08	0.24	0.06	0.03	0.40	0.07	1.87	2.48	4.35

Table VOC Two Wheelers 22 Economic Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.92	0.07	0.02	0.05	0.05	0.14	0.08	0.21	0.04	1.57	1.29	2.86
5	0.89	0.07	0.03	0.05	0.07	0.14	0.08	0.22	0.04	1.58	1.36	2.94
10	0.86	0.08	0.04	0.05	0.09	0.14	0.08	0.23	0.04	1.60	1.43	3.03
15	0.83	0.08	0.04	0.06	0.11	0.14	0.08	0.25	0.04	1.62	1.52	3.14
20	0.82	0.08	0.05	0.06	0.13	0.14	0.08	0.26	0.05	1.65	1.61	3.26
25	0.80	0.08	0.06	0.07	0.14	0.14	0.08	0.28	0.05	1.69	1.72	3.41
30	0.79	0.08	0.07	0.07	0.16	0.14	0.08	0.30	0.05	1.74	1.85	3.58
35	0.79	0.08	0.07	0.08	0.18	0.14	0.08	0.32	0.06	1.79	1.99	3.78
40	0.80	0.08	0.08	0.08	0.20	0.14	0.08	0.35	0.06	1.86	2.16	4.02
45	0.81	0.08	0.09	0.08	0.22	0.14	0.08	0.38	0.07	1.95	2.36	4.30
50	0.83	0.09	0.10	0.09	0.24	0.14	0.08	0.42	0.07	2.05	2.60	4.64

Table VOC Two Wheelers 23 Economic Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.00	0.06	0.01	0.03	0.05	0.00	0.00	0.19	0.03	1.39	1.18	2.57
5	0.96	0.06	0.02	0.04	0.07	0.00	0.00	0.20	0.04	1.39	1.24	2.63
10	0.93	0.06	0.03	0.04	0.09	0.00	0.00	0.21	0.04	1.40	1.31	2.70
15	0.89	0.06	0.03	0.05	0.11	0.00	0.00	0.22	0.04	1.41	1.38	2.78
20	0.87	0.06	0.04	0.05	0.13	0.00	0.00	0.24	0.04	1.43	1.45	2.88
25	0.85	0.07	0.05	0.05	0.14	0.00	0.00	0.25	0.04	1.45	1.54	2.99
30	0.83	0.07	0.06	0.06	0.16	0.00	0.00	0.27	0.05	1.49	1.64	3.13
35	0.82	0.07	0.06	0.06	0.18	0.00	0.00	0.28	0.05	1.53	1.75	3.28
40	0.81	0.07	0.07	0.07	0.20	0.00	0.00	0.31	0.05	1.57	1.88	3.46
45	0.81	0.07	0.08	0.07	0.22	0.00	0.00	0.33	0.06	1.63	2.03	3.67
50	0.82	0.07	0.09	0.08	0.24	0.00	0.00	0.36	0.06	1.71	2.21	3.92

Table VOC Two Wheelers 24 Economic Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.06	0.01	0.04	0.05	0.06	0.03	0.20	0.03	1.46	1.21	2.67
5	0.94	0.07	0.02	0.04	0.07	0.06	0.03	0.21	0.04	1.47	1.27	2.74
10	0.91	0.07	0.03	0.04	0.09	0.06	0.03	0.22	0.04	1.48	1.34	2.82
15	0.88	0.07	0.04	0.05	0.11	0.06	0.03	0.23	0.04	1.49	1.41	2.91
20	0.85	0.07	0.04	0.05	0.13	0.06	0.03	0.24	0.04	1.52	1.49	3.01
25	0.83	0.07	0.05	0.06	0.14	0.06	0.03	0.26	0.05	1.54	1.59	3.13
30	0.82	0.07	0.06	0.06	0.16	0.06	0.03	0.27	0.05	1.58	1.69	3.27
35	0.81	0.07	0.07	0.07	0.18	0.06	0.03	0.29	0.05	1.62	1.81	3.44
40	0.81	0.07	0.07	0.07	0.20	0.06	0.03	0.32	0.06	1.68	1.95	3.63
45	0.81	0.07	0.08	0.08	0.22	0.06	0.03	0.34	0.06	1.74	2.11	3.86
50	0.82	0.07	0.09	0.08	0.24	0.06	0.03	0.37	0.07	1.82	2.31	4.13

Table VOC Two Wheelers 25 Economic Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	,	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.96	0.07	0.02	0.04	0.05	0.14	0.08	0.20	0.04	1.58	1.24	2.82
5	0.92	0.07	0.02	0.04	0.07	0.14	0.08	0.21	0.04	1.59	1.30	2.89
10	0.89	0.07	0.03	0.05	0.09	0.14	0.08	0.22	0.04	1.60	1.37	2.98
15	0.86	0.07	0.04	0.05	0.11	0.14	0.08	0.24	0.04	1.62	1.45	3.07
20	0.84	0.07	0.05	0.06	0.13	0.14	0.08	0.25	0.04	1.65	1.54	3.18
25	0.82	0.07	0.05	0.06	0.14	0.14	0.08	0.27	0.05	1.68	1.64	3.32
30	0.81	0.07	0.06	0.07	0.16	0.14	0.08	0.28	0.05	1.72	1.75	3.47
35	0.80	0.07	0.07	0.07	0.18	0.14	0.08	0.30	0.05	1.77	1.88	3.65
40	0.80	0.07	0.08	0.07	0.20	0.14	0.08	0.33	0.06	1.83	2.03	3.85
45	0.81	0.08	0.08	0.08	0.22	0.14	0.08	0.36	0.06	1.90	2.20	4.10
50	0.83	0.08	0.09	0.08	0.24	0.14	0.08	0.39	0.07	1.98	2.41	4.39

Table VOC Two Wheelers 26 Economic Cost of Operation of Two Wheelers on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.06	0.01	0.04	0.05	0.00	0.00	0.20	0.03	1.38	1.21	2.58
5	0.94	0.07	0.02	0.04	0.07	0.00	0.00	0.21	0.04	1.38	1.27	2.65
10	0.91	0.07	0.03	0.04	0.09	0.00	0.00	0.22	0.04	1.39	1.33	2.72
15	0.88	0.07	0.04	0.05	0.11	0.00	0.00	0.23	0.04	1.41	1.40	2.81
20	0.85	0.07	0.04	0.05	0.13	0.00	0.00	0.24	0.04	1.43	1.49	2.91
25	0.83	0.07	0.05	0.06	0.14	0.00	0.00	0.26	0.04	1.45	1.58	3.03
30	0.82	0.07	0.06	0.06	0.16	0.00	0.00	0.27	0.05	1.49	1.68	3.17
35	0.81	0.07	0.07	0.07	0.18	0.00	0.00	0.29	0.05	1.53	1.80	3.34
40	0.80	0.07	0.07	0.07	0.20	0.00	0.00	0.31	0.06	1.59	1.94	3.53
45	0.80	0.07	0.08	0.08	0.22	0.00	0.00	0.34	0.06	1.65	2.10	3.75
50	0.81	0.07	0.09	0.08	0.24	0.00	0.00	0.37	0.06	1.73	2.29	4.01

Table VOC Two Wheelers 27 Economic Cost of Operation of Two Wheelers on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.96	0.07	0.02	0.04	0.05	0.06	0.03	0.20	0.04	1.46	1.23	2.69
5	0.92	0.07	0.03	0.05	0.07	0.06	0.03	0.21	0.04	1.47	1.30	2.76
10	0.89	0.07	0.03	0.05	0.09	0.06	0.03	0.22	0.04	1.48	1.37	2.84
15	0.86	0.07	0.04	0.05	0.11	0.06	0.03	0.23	0.04	1.50	1.44	2.94
20	0.84	0.07	0.05	0.06	0.13	0.06	0.03	0.25	0.04	1.52	1.53	3.05
25	0.82	0.07	0.05	0.06	0.14	0.06	0.03	0.26	0.05	1.55	1.63	3.18
30	0.81	0.07	0.06	0.07	0.16	0.06	0.03	0.28	0.05	1.59	1.74	3.33
35	0.80	0.08	0.07	0.07	0.18	0.06	0.03	0.30	0.05	1.64	1.86	3.50
40	0.80	0.08	0.08	0.08	0.20	0.06	0.03	0.33	0.06	1.70	2.01	3.71
45	0.81	0.08	0.08	0.08	0.22	0.06	0.03	0.35	0.06	1.77	2.18	3.95
50	0.82	0.08	0.09	0.08	0.24	0.06	0.03	0.39	0.07	1.85	2.39	4.24

Table VOC Two Wheelers 28 Economic Cost of Operation of Two Wheelers on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.94	0.07	0.02	0.05	0.05	0.14	0.08	0.20	0.04	1.58	1.26	2.85
5	0.90	0.07	0.03	0.05	0.07	0.14	0.08	0.22	0.04	1.59	1.33	2.92
10	0.87	0.08	0.04	0.05	0.09	0.14	0.08	0.23	0.04	1.61	1.40	3.01
15	0.85	0.08	0.04	0.06	0.11	0.14	0.08	0.24	0.04	1.63	1.48	3.11
20	0.83	0.08	0.05	0.06	0.13	0.14	0.08	0.26	0.04	1.66	1.57	3.23
25	0.81	0.08	0.06	0.07	0.14	0.14	0.08	0.27	0.05	1.69	1.68	3.37
30	0.80	0.08	0.07	0.07	0.16	0.14	0.08	0.29	0.05	1.74	1.80	3.53
35	0.80	0.08	0.07	0.08	0.18	0.14	0.08	0.31	0.05	1.79	1.93	3.72
40	0.80	0.08	0.08	0.08	0.20	0.14	0.08	0.34	0.06	1.85	2.09	3.94
45	0.81	0.08	0.09	0.08	0.22	0.14	0.08	0.37	0.06	1.93	2.28	4.21
50	0.83	0.09	0.10	0.09	0.24	0.14	0.08	0.41	0.07	2.02	2.50	4.52

Table VOC Two Wheelers 29 Economic Cost of Operation of Two Wheelers on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.00	0.06	0.01	0.03	0.05	0.00	0.00	0.19	0.03	1.39	1.18	2.57
5	0.96	0.06	0.02	0.04	0.07	0.00	0.00	0.20	0.04	1.39	1.24	2.63
10	0.93	0.06	0.03	0.04	0.09	0.00	0.00	0.21	0.04	1.40	1.31	2.70
15	0.89	0.06	0.03	0.05	0.11	0.00	0.00	0.22	0.04	1.41	1.38	2.78
20	0.87	0.06	0.04	0.05	0.13	0.00	0.00	0.24	0.04	1.43	1.45	2.88
25	0.85	0.07	0.05	0.05	0.14	0.00	0.00	0.25	0.04	1.45	1.54	2.99
30	0.83	0.07	0.06	0.06	0.16	0.00	0.00	0.27	0.05	1.49	1.64	3.13
35	0.82	0.07	0.06	0.06	0.18	0.00	0.00	0.28	0.05	1.53	1.75	3.28
40	0.81	0.07	0.07	0.07	0.20	0.00	0.00	0.31	0.05	1.57	1.88	3.46
45	0.81	0.07	0.08	0.07	0.22	0.00	0.00	0.33	0.06	1.63	2.03	3.67
50	0.82	0.07	0.09	0.08	0.24	0.00	0.00	0.36	0.06	1.71	2.21	3.92

Table VOC Two Wheelers 30 Economic Cost of Operation of Two Wheelers on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	•	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.06	0.01	0.04	0.05	0.06	0.03	0.20	0.03	1.46	1.21	2.67
5	0.94	0.07	0.02	0.04	0.07	0.06	0.03	0.21	0.04	1.47	1.27	2.74
10	0.91	0.07	0.03	0.04	0.09	0.06	0.03	0.22	0.04	1.48	1.34	2.82
15	0.88	0.07	0.04	0.05	0.11	0.06	0.03	0.23	0.04	1.49	1.41	2.91
20	0.85	0.07	0.04	0.05	0.13	0.06	0.03	0.24	0.04	1.52	1.49	3.01
25	0.83	0.07	0.05	0.06	0.14	0.06	0.03	0.26	0.05	1.54	1.59	3.13
30	0.82	0.07	0.06	0.06	0.16	0.06	0.03	0.27	0.05	1.58	1.69	3.27
35	0.81	0.07	0.07	0.07	0.18	0.06	0.03	0.29	0.05	1.62	1.81	3.44
40	0.81	0.07	0.07	0.07	0.20	0.06	0.03	0.32	0.06	1.68	1.95	3.63
45	0.81	0.07	0.08	0.08	0.22	0.06	0.03	0.34	0.06	1.74	2.11	3.86
50	0.82	0.07	0.09	0.08	0.24	0.06	0.03	0.37	0.07	1.82	2.31	4.13

Table VOC Two Wheelers 31 Economic Cost of Operation of Two Wheelers on Six Lane Divided Expressways (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.96	0.07	0.02	0.04	0.05	0.14	0.08	0.20	0.04	1.58	1.24	2.82
5	0.92	0.07	0.02	0.04	0.07	0.14	0.08	0.21	0.04	1.59	1.30	2.89
10	0.89	0.07	0.03	0.05	0.09	0.14	0.08	0.22	0.04	1.60	1.37	2.98
15	0.86	0.07	0.04	0.05	0.11	0.14	0.08	0.24	0.04	1.62	1.45	3.07
20	0.84	0.07	0.05	0.06	0.13	0.14	0.08	0.25	0.04	1.65	1.54	3.18
25	0.82	0.07	0.05	0.06	0.14	0.14	0.08	0.27	0.05	1.68	1.64	3.32
30	0.81	0.07	0.06	0.07	0.16	0.14	0.08	0.28	0.05	1.72	1.75	3.47
35	0.80	0.07	0.07	0.07	0.18	0.14	0.08	0.30	0.05	1.77	1.88	3.65
40	0.80	0.07	0.08	0.07	0.20	0.14	0.08	0.33	0.06	1.83	2.03	3.85
45	0.81	0.08	0.08	0.08	0.22	0.14	0.08	0.36	0.06	1.90	2.20	4.10
50	0.83	0.08	0.09	0.08	0.24	0.14	0.08	0.39	0.07	1.98	2.41	4.39

Table VOC Two Wheelers 32 Economic Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.02	0.06	0.01	0.03	0.05	0.00	0.00	0.19	0.03	1.40	1.16	2.56
5	0.98	0.06	0.02	0.04	0.07	0.00	0.00	0.20	0.03	1.40	1.22	2.62
10	0.95	0.06	0.03	0.04	0.09	0.00	0.00	0.21	0.04	1.41	1.28	2.69
15	0.91	0.06	0.03	0.04	0.11	0.00	0.00	0.22	0.04	1.42	1.35	2.76
20	0.88	0.06	0.04	0.05	0.13	0.00	0.00	0.23	0.04	1.43	1.42	2.86
25	0.86	0.06	0.05	0.05	0.14	0.00	0.00	0.24	0.04	1.46	1.51	2.96
30	0.84	0.07	0.06	0.06	0.16	0.00	0.00	0.26	0.05	1.49	1.60	3.09
35	0.83	0.07	0.06	0.06	0.18	0.00	0.00	0.28	0.05	1.52	1.71	3.23
40	0.82	0.07	0.07	0.07	0.20	0.00	0.00	0.30	0.05	1.57	1.83	3.40
45	0.81	0.07	0.08	0.07	0.22	0.00	0.00	0.32	0.06	1.62	1.97	3.60
50	0.82	0.07	0.09	0.08	0.24	0.00	0.00	0.35	0.06	1.69	2.14	3.83

Table VOC Two Wheelers 33
Economic Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.00	0.06	0.01	0.03	0.05	0.06	0.03	0.19	0.03	1.47	1.19	2.66
5	0.96	0.06	0.02	0.04	0.07	0.06	0.03	0.20	0.04	1.48	1.25	2.72
10	0.93	0.06	0.03	0.04	0.09	0.06	0.03	0.21	0.04	1.49	1.31	2.80
15	0.90	0.06	0.03	0.05	0.11	0.06	0.03	0.22	0.04	1.50	1.38	2.88
20	0.87	0.07	0.04	0.05	0.13	0.06	0.03	0.24	0.04	1.52	1.46	2.98
25	0.85	0.07	0.05	0.06	0.14	0.06	0.03	0.25	0.04	1.54	1.55	3.09
30	0.83	0.07	0.06	0.06	0.16	0.06	0.03	0.27	0.05	1.58	1.65	3.23
35	0.82	0.07	0.06	0.06	0.18	0.06	0.03	0.29	0.05	1.62	1.77	3.38
40	0.81	0.07	0.07	0.07	0.20	0.06	0.03	0.31	0.05	1.67	1.90	3.57
45	0.81	0.07	0.08	0.07	0.22	0.06	0.03	0.33	0.06	1.73	2.05	3.78
50	0.82	0.07	0.09	0.08	0.24	0.06	0.03	0.36	0.06	1.80	2.23	4.03

Table VOC Two Wheelers 34
Economic Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.06	0.01	0.04	0.05	0.14	0.08	0.20	0.03	1.59	1.22	2.81
5	0.94	0.07	0.02	0.04	0.07	0.14	0.08	0.21	0.04	1.60	1.28	2.87
10	0.91	0.07	0.03	0.04	0.09	0.14	0.08	0.22	0.04	1.61	1.34	2.95
15	0.88	0.07	0.04	0.05	0.11	0.14	0.08	0.23	0.04	1.62	1.42	3.04
20	0.86	0.07	0.04	0.05	0.13	0.14	0.08	0.24	0.04	1.65	1.50	3.15
25	0.84	0.07	0.05	0.06	0.14	0.14	0.08	0.26	0.05	1.68	1.60	3.27
30	0.82	0.07	0.06	0.06	0.16	0.14	0.08	0.28	0.05	1.71	1.70	3.42
35	0.81	0.07	0.07	0.07	0.18	0.14	0.08	0.30	0.05	1.76	1.83	3.58
40	0.81	0.07	0.07	0.07	0.20	0.14	0.08	0.32	0.06	1.81	1.97	3.78
45	0.81	0.07	0.08	0.08	0.22	0.14	0.08	0.35	0.06	1.88	2.13	4.01
50	0.82	0.07	0.09	0.08	0.24	0.14	0.08	0.38	0.07	1.96	2.33	4.28

Table VOC Two Wheelers 35 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.69	0.09	0.04	0.09	0.11	0.00	0.00	0.29	0.07	2.37	1.21	3.59
5	1.67	0.09	0.06	0.10	0.15	0.00	0.00	0.31	0.07	2.45	1.30	3.74
10	1.67	0.09	0.07	0.11	0.19	0.00	0.00	0.33	0.08	2.54	1.40	3.93
15	1.68	0.09	0.09	0.12	0.23	0.00	0.00	0.36	0.08	2.65	1.51	4.16
20	1.72	0.09	0.10	0.12	0.27	0.00	0.00	0.39	0.09	2.79	1.64	4.43
25	1.77	0.10	0.12	0.13	0.31	0.00	0.00	0.43	0.10	2.95	1.80	4.75
30	1.85	0.10	0.13	0.14	0.35	0.00	0.00	0.48	0.11	3.15	2.00	5.15
35	1.96	0.10	0.15	0.15	0.38	0.00	0.00	0.53	0.13	3.40	2.24	5.63
40	2.11	0.10	0.16	0.16	0.42	0.00	0.00	0.61	0.14	3.70	2.55	6.25
45	2.32	0.10	0.18	0.17	0.46	0.00	0.00	0.70	0.17	4.10	2.95	7.05
50	2.63	0.10	0.19	0.18	0.50	0.00	0.00	0.84	0.20	4.63	3.51	8.14

Table VOC Two Wheelers 36 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.65	0.10	0.05	0.11	0.11	0.10	0.05	0.31	0.07	2.56	1.28	3.84
5	1.65	0.10	0.07	0.11	0.15	0.10	0.05	0.33	0.08	2.65	1.38	4.02
10	1.66	0.11	0.08	0.12	0.19	0.10	0.05	0.35	0.08	2.75	1.49	4.24
15	1.69	0.11	0.10	0.13	0.23	0.10	0.05	0.39	0.09	2.89	1.62	4.51
20	1.74	0.11	0.11	0.14	0.27	0.10	0.05	0.42	0.10	3.05	1.77	4.82
25	1.81	0.11	0.13	0.15	0.31	0.10	0.05	0.47	0.11	3.24	1.96	5.20
30	1.92	0.11	0.15	0.16	0.35	0.10	0.05	0.52	0.12	3.48	2.19	5.67
35	2.06	0.11	0.16	0.17	0.38	0.10	0.05	0.59	0.14	3.77	2.49	6.26
40	2.26	0.12	0.18	0.18	0.42	0.10	0.05	0.68	0.16	4.15	2.87	7.03
45	2.55	0.12	0.19	0.18	0.46	0.10	0.05	0.81	0.19	4.66	3.40	8.06
50	2.97	0.12	0.21	0.19	0.50	0.10	0.05	0.99	0.23	5.37	4.16	9.53

Table VOC Two Wheelers 37 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.63	0.12	0.07	0.12	0.11	0.25	0.14	0.32	0.08	2.83	1.36	4.19
5	1.64	0.12	0.08	0.13	0.15	0.25	0.14	0.35	0.08	2.94	1.47	4.41
10	1.67	0.12	0.10	0.14	0.19	0.25	0.14	0.38	0.09	3.07	1.60	4.66
15	1.71	0.13	0.11	0.15	0.23	0.25	0.14	0.42	0.10	3.22	1.75	4.97
20	1.78	0.13	0.13	0.16	0.27	0.25	0.14	0.46	0.11	3.41	1.93	5.34
25	1.88	0.13	0.14	0.17	0.31	0.25	0.14	0.51	0.12	3.64	2.15	5.79
30	2.02	0.14	0.16	0.18	0.35	0.25	0.14	0.58	0.14	3.93	2.43	6.36
35	2.21	0.14	0.17	0.18	0.38	0.25	0.14	0.67	0.16	4.29	2.80	7.09
40	2.47	0.14	0.19	0.19	0.42	0.25	0.14	0.78	0.18	4.77	3.30	8.07
45	2.87	0.14	0.20	0.20	0.46	0.25	0.14	0.95	0.22	5.44	4.01	9.45
50	3.48	0.15	0.22	0.21	0.50	0.25	0.14	1.22	0.29	6.45	5.12	11.56

Table VOC Two Wheelers 38 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.62	0.15	0.08	0.14	0.11	0.39	0.22	0.35	0.08	3.13	1.45	4.58
5	1.64	0.15	0.09	0.15	0.15	0.39	0.22	0.37	0.09	3.25	1.57	4.83
10	1.68	0.15	0.11	0.16	0.19	0.39	0.22	0.41	0.10	3.41	1.72	5.12
15	1.75	0.16	0.13	0.17	0.23	0.39	0.22	0.45	0.11	3.59	1.89	5.48
20	1.84	0.16	0.14	0.17	0.27	0.39	0.22	0.50	0.12	3.81	2.11	5.92
25	1.97	0.16	0.16	0.18	0.31	0.39	0.22	0.57	0.13	4.09	2.38	6.47
30	2.15	0.17	0.17	0.19	0.35	0.39	0.22	0.65	0.15	4.44	2.73	7.17
35	2.40	0.17	0.19	0.20	0.38	0.39	0.22	0.76	0.18	4.90	3.20	8.10
40	2.77	0.18	0.20	0.21	0.42	0.39	0.22	0.92	0.22	5.53	3.87	9.40
45	3.34	0.18	0.22	0.22	0.46	0.39	0.22	1.16	0.27	6.46	4.89	11.35
50	4.31	0.19	0.23	0.23	0.50	0.39	0.22	1.58	0.37	8.02	6.63	14.65

Table VOC Two Wheelers 39 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.62	0.19	0.09	0.16	0.11	0.54	0.30	0.37	0.09	3.46	1.55	5.01
5	1.66	0.19	0.11	0.17	0.15	0.54	0.30	0.40	0.09	3.60	1.69	5.30
10	1.72	0.20	0.12	0.17	0.19	0.54	0.30	0.44	0.10	3.78	1.86	5.64
15	1.80	0.20	0.14	0.18	0.23	0.54	0.30	0.49	0.12	4.00	2.07	6.07
20	1.93	0.21	0.15	0.19	0.27	0.54	0.30	0.55	0.13	4.27	2.33	6.60
25	2.10	0.22	0.17	0.20	0.31	0.54	0.30	0.63	0.15	4.61	2.66	7.27
30	2.34	0.22	0.18	0.21	0.35	0.54	0.30	0.74	0.17	5.05	3.11	8.16
35	2.68	0.23	0.20	0.22	0.38	0.54	0.30	0.89	0.21	5.65	3.74	9.38
40	3.20	0.24	0.21	0.23	0.42	0.54	0.30	1.11	0.26	6.52	4.68	11.20
45	4.08	0.25	0.23	0.24	0.46	0.54	0.30	1.49	0.35	7.93	6.26	14.19
50	5.84	0.26	0.24	0.24	0.50	0.54	0.30	2.25	0.53	10.70	9.44	20.14

Table VOC Two Wheelers 40 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.63	0.26	0.11	0.17	0.11	0.69	0.38	0.40	0.09	3.83	1.67	5.49
5	1.69	0.27	0.12	0.18	0.15	0.69	0.38	0.44	0.10	4.01	1.83	5.84
10	1.77	0.28	0.14	0.19	0.19	0.69	0.38	0.48	0.11	4.22	2.03	6.25
15	1.88	0.29	0.15	0.20	0.23	0.69	0.38	0.54	0.13	4.49	2.28	6.77
20	2.05	0.30	0.17	0.21	0.27	0.69	0.38	0.62	0.15	4.82	2.60	7.42
25	2.27	0.32	0.18	0.22	0.31	0.69	0.38	0.72	0.17	5.25	3.02	8.27
30	2.59	0.34	0.20	0.23	0.35	0.69	0.38	0.86	0.20	5.82	3.61	9.43
35	3.08	0.35	0.21	0.23	0.38	0.69	0.38	1.07	0.25	6.64	4.49	11.13
40	3.87	0.37	0.23	0.24	0.42	0.69	0.38	1.41	0.33	7.94	5.92	13.86
45	5.41	0.40	0.24	0.25	0.46	0.69	0.38	2.07	0.49	10.38	8.69	19.07
50	9.62	0.42	0.26	0.26	0.50	0.69	0.38	3.89	0.92	16.93	16.34	33.27

Table VOC Two Wheelers 41 Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.66	0.41	0.12	0.19	0.11	0.83	0.46	0.43	0.10	4.31	1.80	6.11
5	1.73	0.44	0.13	0.20	0.15	0.83	0.46	0.47	0.11	4.53	1.99	6.53
10	1.84	0.47	0.15	0.21	0.19	0.83	0.46	0.53	0.13	4.81	2.23	7.04
15	2.00	0.51	0.16	0.22	0.23	0.83	0.46	0.60	0.14	5.15	2.54	7.69
20	2.21	0.55	0.18	0.23	0.27	0.83	0.46	0.70	0.16	5.59	2.94	8.53
25	2.51	0.60	0.19	0.23	0.31	0.83	0.46	0.83	0.20	6.16	3.50	9.66
30	2.96	0.66	0.21	0.24	0.35	0.83	0.46	1.03	0.24	6.98	4.31	11.29
35	3.69	0.73	0.22	0.25	0.38	0.83	0.46	1.34	0.31	8.22	5.61	13.84
40	5.04	0.83	0.24	0.26	0.42	0.83	0.46	1.92	0.45	10.45	8.05	18.49
45	8.44	0.95	0.25	0.27	0.46	0.83	0.46	3.38	0.80	15.84	14.22	30.06
50	33.96	1.11	0.27	0.28	0.50	0.83	0.46	14.48	3.41	55.29	60.81	116.10

Table VOC Two Wheelers 42 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.80	0.08	0.03	0.08	0.11	0.00	0.00	0.26	0.06	2.43	1.09	3.52
5	1.76	0.08	0.05	0.09	0.15	0.00	0.00	0.28	0.07	2.47	1.16	3.64
10	1.74	0.08	0.06	0.10	0.19	0.00	0.00	0.30	0.07	2.54	1.25	3.78
15	1.73	0.09	0.08	0.10	0.23	0.00	0.00	0.32	0.08	2.62	1.34	3.96
20	1.73	0.09	0.09	0.11	0.27	0.00	0.00	0.35	0.08	2.72	1.45	4.17
25	1.75	0.09	0.11	0.12	0.31	0.00	0.00	0.38	0.09	2.84	1.58	4.42
30	1.80	0.09	0.12	0.13	0.35	0.00	0.00	0.41	0.10	3.00	1.74	4.73
35	1.87	0.09	0.14	0.14	0.38	0.00	0.00	0.46	0.11	3.19	1.93	5.11
40	1.97	0.09	0.15	0.15	0.42	0.00	0.00	0.52	0.12	3.42	2.16	5.59
45	2.12	0.09	0.17	0.16	0.46	0.00	0.00	0.59	0.14	3.72	2.47	6.19
50	2.32	0.09	0.18	0.17	0.50	0.00	0.00	0.68	0.16	4.12	2.87	6.99

Table VOC Two Wheelers 43 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.77	0.09	0.04	0.09	0.11	0.10	0.05	0.27	0.06	2.59	1.13	3.72
5	1.74	0.09	0.06	0.10	0.15	0.10	0.05	0.29	0.07	2.64	1.21	3.85
10	1.72	0.09	0.07	0.11	0.19	0.10	0.05	0.31	0.07	2.71	1.30	4.02
15	1.72	0.09	0.09	0.12	0.23	0.10	0.05	0.33	0.08	2.81	1.41	4.21
20	1.73	0.09	0.10	0.12	0.27	0.10	0.05	0.36	0.09	2.92	1.53	4.45
25	1.77	0.10	0.12	0.13	0.31	0.10	0.05	0.40	0.09	3.06	1.67	4.74
30	1.83	0.10	0.13	0.14	0.35	0.10	0.05	0.44	0.10	3.24	1.85	5.09
35	1.91	0.10	0.15	0.15	0.38	0.10	0.05	0.49	0.12	3.46	2.07	5.52
40	2.04	0.10	0.16	0.16	0.42	0.10	0.05	0.56	0.13	3.73	2.34	6.07
45	2.22	0.10	0.18	0.17	0.46	0.10	0.05	0.64	0.15	4.08	2.70	6.78
50	2.48	0.10	0.19	0.18	0.50	0.10	0.05	0.76	0.18	4.55	3.19	7.74

Table VOC Two Wheelers 44 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	1.74	0.10	0.05	0.10	0.11	0.25	0.14	0.28	0.07	2.83	1.18	4.01
5	1.71	0.10	0.07	0.11	0.15	0.25	0.14	0.30	0.07	2.89	1.27	4.16
10	1.71	0.10	0.08	0.12	0.19	0.25	0.14	0.32	0.08	2.98	1.36	4.34
15	1.71	0.10	0.10	0.13	0.23	0.25	0.14	0.35	0.08	3.08	1.48	4.56
20	1.74	0.10	0.11	0.14	0.27	0.25	0.14	0.38	0.09	3.21	1.61	4.83
25	1.79	0.11	0.13	0.15	0.31	0.25	0.14	0.42	0.10	3.38	1.78	5.15
30	1.87	0.11	0.14	0.15	0.35	0.25	0.14	0.47	0.11	3.58	1.98	5.55
35	1.98	0.11	0.16	0.16	0.38	0.25	0.14	0.53	0.12	3.83	2.23	6.05
40	2.14	0.11	0.17	0.17	0.42	0.25	0.14	0.61	0.14	4.14	2.55	6.69
45	2.36	0.11	0.19	0.18	0.46	0.25	0.14	0.71	0.17	4.56	2.98	7.54
50	2.69	0.12	0.20	0.19	0.50	0.25	0.14	0.85	0.20	5.13	3.59	8.72

Table VOC Two Wheelers 45 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.71	0.11	0.06	0.11	0.11	0.39	0.22	0.29	0.07	3.07	1.23	4.30
5	1.70	0.11	0.07	0.12	0.15	0.39	0.22	0.32	0.07	3.15	1.32	4.47
10	1.70	0.11	0.09	0.13	0.19	0.39	0.22	0.34	0.08	3.25	1.43	4.68
15	1.72	0.11	0.10	0.14	0.23	0.39	0.22	0.37	0.09	3.37	1.56	4.93
20	1.76	0.12	0.12	0.15	0.27	0.39	0.22	0.41	0.10	3.52	1.71	5.23
25	1.82	0.12	0.14	0.16	0.31	0.39	0.22	0.45	0.11	3.70	1.89	5.60
30	1.92	0.12	0.15	0.17	0.35	0.39	0.22	0.50	0.12	3.93	2.12	6.05
35	2.06	0.12	0.17	0.17	0.38	0.39	0.22	0.57	0.14	4.22	2.41	6.63
40	2.25	0.13	0.18	0.18	0.42	0.39	0.22	0.67	0.16	4.60	2.79	7.39
45	2.54	0.13	0.20	0.19	0.46	0.39	0.22	0.79	0.19	5.10	3.32	8.42
50	2.96	0.13	0.21	0.20	0.50	0.39	0.22	0.98	0.23	5.82	4.10	9.91

Table VOC Two Wheelers 46 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.69	0.12	0.07	0.12	0.11	0.54	0.30	0.31	0.07	3.33	1.29	4.62
5	1.68	0.12	0.08	0.13	0.15	0.54	0.30	0.33	0.08	3.42	1.39	4.81
10	1.70	0.13	0.10	0.14	0.19	0.54	0.30	0.36	0.08	3.53	1.51	5.04
15	1.73	0.13	0.11	0.15	0.23	0.54	0.30	0.39	0.09	3.67	1.65	5.32
20	1.78	0.13	0.13	0.16	0.27	0.54	0.30	0.43	0.10	3.84	1.82	5.66
25	1.87	0.13	0.14	0.17	0.31	0.54	0.30	0.48	0.11	4.05	2.03	6.08
30	1.99	0.14	0.16	0.18	0.35	0.54	0.30	0.55	0.13	4.32	2.29	6.61
35	2.16	0.14	0.17	0.19	0.38	0.54	0.30	0.63	0.15	4.65	2.63	7.29
40	2.40	0.14	0.19	0.19	0.42	0.54	0.30	0.74	0.17	5.10	3.10	8.20
45	2.76	0.15	0.20	0.20	0.46	0.54	0.30	0.89	0.21	5.72	3.76	9.48
50	3.33	0.15	0.22	0.21	0.50	0.54	0.30	1.14	0.27	6.65	4.78	11.43

Table VOC Two Wheelers 47 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.67	0.14	0.08	0.14	0.11	0.69	0.38	0.32	0.08	3.60	1.35	4.94
5	1.68	0.14	0.09	0.14	0.15	0.69	0.38	0.35	0.08	3.70	1.46	5.16
10	1.70	0.15	0.11	0.15	0.19	0.69	0.38	0.38	0.09	3.83	1.59	5.42
15	1.75	0.15	0.12	0.16	0.23	0.69	0.38	0.42	0.10	3.99	1.75	5.73
20	1.82	0.15	0.14	0.17	0.27	0.69	0.38	0.46	0.11	4.18	1.94	6.12
25	1.92	0.16	0.15	0.18	0.31	0.69	0.38	0.52	0.12	4.42	2.18	6.60
30	2.07	0.16	0.17	0.19	0.35	0.69	0.38	0.59	0.14	4.73	2.49	7.22
35	2.29	0.16	0.18	0.20	0.38	0.69	0.38	0.69	0.16	.5.13	2.90	8.03
40	2.60	0.17	0.20	0.21	0.42	0.69	0.38	0.83	0.19	5.68	3.47	9.14
45	3.06	0.17	0.21	0.21	0.46	0.69	0.38	1.03	0.24	6.46	4.32	10.78
50	3.84	0.18	0.23	0.22	0.50	0.69	0.38	1.36	0.32	7.72	5.73	13.45

Table VOC Two Wheelers 48 Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.67	0.16	0.09	0.15	0.11	0.83	0.46	0.34	0.08	3.88	1.41	5.29
5	1.68	0.17	0.10	0.16	0.15	0.83	0.46	0.37	0.09	4.00	1.54	5.53
10	1.72	0.17	0.12	0.16	0.19	0.83	0.46	0.40	0.09	4.14	1.68	5.83
15	1.78	0.17	0.13	0.17	0.23	0.83	0.46	0.44	0.10	4.32	1.86	6.18
20	1.87	0.18	0.15	0.18	0.27	0.83	0.46	0.50	0.12	4.55	2.08	6.63
25	2.00	0.18	0.16	0.19	0.31	0.83	0.46	0.56	0.13	4.83	2.36	7.19
30	2.19	0.19	0.18	0.20	0.35	0.83	0.46	0.65	0.15	5.19	2.72	7.91
35	2.45	0.20	0.19	0.21	0.38	0.83	0.46	0.77	0.18	5.67	3.22	8.89
40	2.85	0.20	0.21	0.22	0.42	0.83	0.46	0.94	0.22	6.35	3.94	10.29
45	3.48	0.21	0.22	0.23	0.46	0.83	0.46	1.21	0.28	7.38	5.08	12.47
50	4.62	0.22	0.24	0.23	0.50	0.83	0.46	1.70	0.40	9.21	7.15	16.35

Table VOC Two Wheelers 49 Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.82	0.08	0.03	0.07	0.11	0.00	0.00	0.26	0.06	2.43	1.53	3.97
5	1.78	0.08	0.04	0.08	0.15	0.00	0.00	0.27	0.06	2.47	1.64	4.11
10	1.74	0.08	0.06	0.09	0.19	0.00	0.00	0.30	0.07	2.53	1.77	4.29
15	1.73	0.08	0.07	0.10	0.23	0.00	0.00	0.32	0.08	2.60	1.91	4.52
20	1.73	0.08	0.09	0.11	0.27	0.00	0.00	0.35	0.08	2.71	2.09	4.79
25	1.75	0.08	0.11	0.12	0.31	0.00	0.00	0.38	0.09	2.84	2.29	5.13
30	1.80	0.09	0.12	0.13	0.35	0.00	0.00	0.42	0.10	3.00	2.54	5.54
35	1.88	0.09	0.14	0.13	0.38	0.00	0.00	0.48	0.11	3.21	2.85	6.07
40	2.01	0.09	0.15	0.14	0.42	0.00	0.00	0.54	0.13	3.49	3.25	6.74
45	2.19	0.09	0.17	0.15	0.46	0.00	0.00	0.63	0.15	3.84	3.79	7.63
50	2.46	0.09	0.18	0.16	0.50	0.00	0.00	0.75	0.18	4.33	4.52	8.85

Table VOC Two Wheelers 50 Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.79	0.08	0.04	0.08	0.11	0.10	0.05	0.26	0.06	2.59	1.58	4.17
5	1.75	0.09	0.05	0.09	0.15	0.10	0.05	0.28	0.07	2.63	1.70	4.33
10	1.73	0.09	0.07	0.10	0.19	0.10	0.05	0.31	0.07	2.70	1.83	4.53
15	1.72	0.09	0.08	0.11	0.23	0.10	0.05	0.33	0.08	2.79	1.99	4.78
20	1.73	0.09	0.10	0.12	0.27	0.10	0.05	0.36	0.09	2.90	2.18	5.08
25	1.77	0.09	0.11	0.13	0.31	0.10	0.05	0.40	0.09	3.05	2.40	5.46
30	1.83	0.09	0.13	0.13	0.35	0.10	0.05	0.45	0.11	3.24	2.68	5.92
35	1.93	0.09	0.14	0.14	0.38	0.10	0.05	0.51	0.12	3.47	3.03	6.51
40	2.08	0.09	0.16	0.15	0.42	0.10	0.05	0.58	0.14	3.78	3.49	7.27
45	2.30	0.10	0.17	0.16	0.46	0.10	0.05	0.69	0.16	4.20	4.11	8.30
50	2.63	0.10	0.19	0.17	0.50	0.10	0.05	0.83	0.20	4.77	4.99	9.76

Table VOC Two Wheelers 51 Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	_	Grand Cost
0	1.77	0.09	0.04	0.09	0.11	0.25	0.14	0.27	0.06	2.82	1.64	4.46
5	1.73	0.09	0.06	0.10	0.15	0.25	0.14	0.29	0.07	2.88	1.76	4.64
10	1.72	0.09	0.07	0.11	0.19	0.25	0.14	0.32	0.07	2.95	1.91	4.86
15	1.72	0.09	0.09	0.12	0.23	0.25	0.14	0.35	0.08	3.05	2.08	5.13
20	1.74	0.10	0.10	0.13	0.27	0.25	0.14	0.38	0.09	3.18	2.28	5.47
25	1.79	0.10	0.12	0.14	0.31	0.25	0.14	0.42	0.10	3.35	2.53	5.88
30	1.87	0.10	0.13	0.14	0.35	0.25	0.14	0.47	0.11	3.56	2.84	6.40
35	1.99	0.10	0.15	0.15	0.38	0.25	0.14	0.54	0.13	3.83	3.24	7.06
40	2.17	0.10	0.16	0.16	0.42	0.25	0.14	0.63	0.15	4.18	3.76	7.94
45	2.44	0.10	0.18	0.17	0.46	0.25	0.14	0.75	0.18	4.66	4.49	9.15
50	2.85	0.11	0.19	0.18	0.50	0.25	0.14	0.93	0.22	5.36	5.56	10.92

Table VOC Two Wheelers 52 Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.74	0.10	0.05	0.10	0.11	0.39	0.22	0.28	0.07	3.06	1.69	4.75
5	1.72	0.10	0.07	0.11	0.15	0.39	0.22	0.31	0.07	3.13	1.83	4.95
10	1.71	0.10	0.08	0.12	0.19	0.39	0.22	0.33	0.08	3.21	1.98	5.20
15	1.72	0.10	0.10	0.13	0.23	0.39	0.22	0.36	0.09	3.33	2.17	5.50
20	1.75	0.10	0.11	0.14	0.27	0.39	0.22	0.40	0.09	3.47	2.39	5.87
25	1.82	0.11	0.13	0.14	0.31	0.39	0.22	0.45	0.10	3.66	2.67	6.33
30	1.92	0.11	0.14	0.15	0.35	0.39	0.22	0.50	0.12	3.89	3.02	6.91
35	2.06	0.11	0.16	0.16	0.38	0.39	0.22	0.58	0.14	4.20	3.47	7.67
40	2.28	0.11	0.17	0.17	0.42	0.39	0.22	0.68	0.16	4.61	4.08	8.68
45	2.61	0.11	0.19	0.18	0.46	0.39	0.22	0.83	0.19	5.18	4.94	10.12
50	3.12	0.11	0.20	0.19	0.50	0.39	0.22	1.05	0.25	6.03	6.28	12.31

Table VOC Two Wheelers 53 Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.72	0.11	0.06	0.11	0.11	0.54	0.30	0.29	0.07	3.30	1.76	5.06
5	1.71	0.11	0.07	0.12	0.15	0.54	0.30	0.32	0.07	3.38	1.90	5.28
10	1.71	0.11	0.09	0.13	0.19	0.54	0.30	0.35	0.08	3.48	2.07	5.55
15	1.73	0.11	0.10	0.14	0.23	0.54	0.30	0.38	0.09	3.61	2.27	5.88
20	1.78	0.11	0.12	0.14	0.27	0.54	0.30	0.42	0.10	3.77	2.52	6.29
25	1.85	0.11	0.13	0.15	0.31	0.54	0.30	0.47	0.11	3.98	2.83	6.81
30	1.98	0.12	0.15	0.16	0.35	0.54	0.30	0.54	0.13	4.25	3.22	7.46
35	2.15	0.12	0.16	0.17	0.38	0.54	0.30	0.62	0.15	4.60	3.73	8.33
40	2.42	0.12	0.18	0.18	0.42	0.54	0.30	0.74	0.17	5.07	4.45	9.52
45	2.82	0.12	0.19	0.19	0.46	0.54	0.30	0.92	0.22	5.76	5.51	11.26
50	3.48	0.13	0.21	0.20	0.50	0.54	0.30	1.21	0.28	6.84	7.22	14.06

Table VOC Two Wheelers 54 Financial Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.08	0.03	0.07	0.11	0.00	0.00	0.20	0.05	2.83	1.23	4.05
5	2.19	0.08	0.04	0.08	0.15	0.00	0.00	0.21	0.05	2.82	1.29	4.10
10	2.12	0.08	0.06	0.09	0.19	0.00	0.00	0.23	0.05	2.82	1.36	4.17
15	2.05	0.08	0.07	0.10	0.23	0.00	0.00	0.24	0.06	2.83	1.44	4.26
20	1.99	0.08	0.09	0.11	0.27	0.00	0.00	0.25	0.06	2.85	1.52	4.38
25	1.95	0.08	0.11	0.12	0.31	0.00	0.00	0.27	0.06	2.89	1.62	4.51
30	1.92	0.09	0.12	0.13	0.35	0.00	0.00	0.29	0.07	2.95	1.73	4.68
35	1.90	0.09	0.14	0.13	0.38	0.00	0.00	0.31	0.07	3.02	1.85	4.87
40	1.89	0.09	0.15	0.14	0.42	0.00	0.00	0.33	0.08	3.11	2.00	5.11
45	1.91	0.09	0.17	0.15	0.46	0.00	0.00	0.36	0.08	3.22	2.17	5.39
50	1.94	0.09	0.18	0.16	0.50	0.00	0.00	0.39	0.09	3.36	2.37	5.73

Table VOC Two Wheelers 55 Financial Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.23	0.08	0.04	0.08	0.11	0.10	0.05	0.21	0.05	2.96	1.26	4.21
5	2.15	0.09	0.05	0.09	0.15	0.10	0.05	0.22	0.05	2.95	1.32	4.27
10	2.08	0.09	0.07	0.10	0.19	0.10	0.05	0.23	0.05	2.96	1.39	4.35
15	2.02	0.09	0.08	0.11	0.23	0.10	0.05	0.24	0.06	2.98	1.47	4.45
20	1.97	0.09	0.10	0.12	0.27	0.10	0.05	0.26	0.06	3.01	1.57	4.58
25	1.93	0.09	0.11	0.13	0.31	0.10	0.05	0.28	0.07	3.06	1.67	4.72
30	1.90	0.09	0.13	0.13	0.35	0.10	0.05	0.30	0.07	3.12	1.78	4.90
35	1.89	0.09	0.14	0.14	0.38	0.10	0.05	0.32	0.07	3.20	1.92	5.12
40	1.89	0.09	0.16	0.15	0.42	0.10	0.05	0.34	0.08	3.30	2.07	5.37
45	1.91	0.10	0.17	0.16	0.46	0.10	0.05	0.37	0.09	3.42	2.26	5.68
50	1.96	0.10	0.19	0.17	0.50	0.10	0.05	0.41	0.10	3.57	2.48	6.05

Table VOC Two Wheelers 56 Financial Cost of Operation of Two Wheelers on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.19	0.09	0.04	0.09	0.11	0.25	0.14	0.21	0.05	3.17	1.29	4.45
5	2.11	0.09	0.06	0.10	0.15	0.25	0.14	0.22	0.05	3.17	1.36	4.52
10	2.04	0.09	0.07	0.11	0.19	0.25	0.14	0.24	0.06	3.18	1.43	4.61
15	1.99	0.09	0.09	0.12	0.23	0.25	0.14	0.25	0.06	3.21	1.52	4.72
20	1.94	0.10	0.10	0.13	0.27	0.25	0.14	0.27	0.06	3.25	1.61	4.86
25	1.91	0.10	0.12	0.14	0.31	0.25	0.14	0.29	0.07	3.30	1.72	5.02
30	1.89	0.10	0.13	0.14	0.35	0.25	0.14	0.31	0.07	3.37	1.85	5.22
35	1.88	0.10	0.15	0.15	0.38	0.25	0.14	0.33	0.08	3.46	1.99	5.45
40	1.90	0.10	0.16	0.16	0.42	0.25	0.14	0.36	0.08	3.57	2.16	5.73
45	1.93	0.10	0.18	0.17	0.46	0.25	0.14	0.39	0.09	3.71	2.36	6.07
50	1.98	0.11	0.19	0.18	0.50	0.25	0.14	0.43	0.10	3.87	2.60	6.47

Table VOC Two Wheelers 57 Financial Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.38	0.08	0.02	0.07	0.11	0.00	0.00	0.20	0.05	2.90	1.18	4.09
5	2.29	0.08	0.04	0.08	0.15	0.00	0.00	0.21	0.05	2.89	1.24	4.13
10	2.20	0.08	0.06	0.08	0.19	0.00	0.00	0.22	0.05	2.88	1.31	4.18
15	2.13	0.08	0.07	0.09	0.23	0.00	0.00	0.23	0.05	2.88	1.38	4.26
20	2.07	0.08	0.09	0.10	0.27	0.00	0.00	0.24	0.06	2.90	1.45	4.35
25	2.01	0.08	0.10	0.11	0.31	0.00	0.00	0.26	0.06	2.93	1.54	4.47
30	1.97	0.08	0.12	0.12	0.35	0.00	0.00	0.27	0.06	2.97	1.64	4.61
35	1.94	0.08	0.13	0.13	0.38	0.00	0.00	0.29	0.07	3.03	1.75	4.78
40	1.93	0.08	0.15	0.14	0.42	0.00	0.00	0.31	0.07	3.10	1.88	4.99
45	1.92	0.08	0.16	0.15	0.46	0.00	0.00	0.34	0.08	3.20	2.03	5.23
50	1.94	0.09	0.18	0.15	0.50	0.00	0.00	0.37	0.09	3.31	2.21	5.52

Table VOC Two Wheelers 58 Financial Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.08	0.03	0.07	0.11	0.10	0.05	0.20	0.05	3.02	1.21	4.24
5	2.24	0.08	0.04	0.08	0.15	0.10	0.05	0.21	0.05	3.01	1.27	4.28
10	2.16	0.08	0.06	0.09	0.19	0.10	0.05	0.22	0.05	3.01	1.34	4.35
15	2.09	0.08	0.07	0.10	0.23	0.10	0.05	0.23	0.06	3.02	1.41	4.43
20	2.03	0.08	0.09	0.11	0.27	0.10	0.05	0.25	0.06	3.04	1.49	4.54
25	1.99	0.08	0.11	0.12	0.31	0.10	0.05	0.26	0.06	3.08	1.59	4.66
30	1.95	0.09	0.12	0.13	0.35	0.10	0.05	0.28	0.07	3.13	1.69	4.82
35	1.93	0.09	0.14	0.13	0.38	0.10	0.05	0.30	0.07	3.19	1.81	5.01
40	1.92	0.09	0.15	0.14	0.42	0.10	0.05	0.32	0.08	3.28	1.95	5.23
45	1.93	0.09	0.17	0.15	0.46	0.10	0.05	0.35	0.08	3.38	2.11	5.50
50	1.95	0.09	0.18	0.16	0.50	0.10	0.05	0.38	0.09	3.51	2.31	5.82

Table VOC Two Wheelers 59 Financial Cost of Operation of Two Wheelers on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	_	Grand Cost
0	2.28	0.08	0.03	0.08	0.11	0.25	0.14	0.21	0.05	3.22	1.24	4.46
5	2.20	0.08	0.05	0.09	0.15	0.25	0.14	0.22	0.05	3.22	1.30	4.52
10	2.12	0.08	0.06	0.10	0.19	0.25	0.14	0.23	0.05	3.22	1.37	4.59
15	2.06	0.09	0.08	0.11	0.23	0.25	0.14	0.24	0.06	3.23	1.45	4.68
20	2.00	0.09	0.09	0.11	0.27	0.25	0.14	0.25	0.06	3.26	1.54	4.80
25	1.96	0.09	0.11	0.12	0.31	0.25	0.14	0.27	0.06	3.30	1.64	4.94
30	1.93	0.09	0.12	0.13	0.35	0.25	0.14	0.29	0.07	3.36	1.75	5.11
35	1.91	0.09	0.14	0.14	0.38	0.25	0.14	0.31	0.07	3.44	1.88	5.31
40	1.91	0.09	0.16	0.15	0.42	0.25	0.14	0.34	0.08	3.53	2.03	5.56
45	1.93	0.09	0.17	0.16	0.46	0.25	0.14	0.37	0.09	3.65	2.20	5.85
50	1.97	0.09	0.19	0.17	0.50	0.25	0.14	0.40	0.09	3.79	2.41	6.20

Table VOC Two Wheelers 60 Financial Cost of Operation of Two Wheelers on Four Lane Divided Expressways Roads (Rs/km) Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.08	0.03	0.07	0.11	0.00	0.00	0.20	0.05	2.87	1.21	4.08
5	2.24	0.08	0.04	0.08	0.15	0.00	0.00	0.21	0.05	2.86	1.27	4.12
10	2.16	0.08	0.06	0.09	0.19	0.00	0.00	0.22	0.05	2.85	1.33	4.18
15	2.09	0.08	0.07	0.10	0.23	0.00	0.00	0.23	0.05	2.86	1.40	4.27
20	2.03	80.0	0.09	0.11	0.27	0.00	0.00	0.25	0.06	2.88	1.49	4.37
25	1.98	0.08	0.11	0.12	0.31	0.00	0.00	0.26	0.06	2.92	1.58	4.49
30	1.94	0.09	0.12	0.13	0.35	0.00	0.00	0.28	0.07	2.96	1.68	4.65
35	1.92	0.09	0.14	0.13	0.38	0.00	0.00	0.30	0.07	3.03	1.80	4.83
40	1.91	0.09	0.15	0.14	0.42	0.00	0.00	0.32	0.08	3.11	1.94	5.05
45	1.91	0.09	0.17	0.15	0.46	0.00	0.00	0.35	0.08	3.21	2.10	5.31
50	1.94	0.09	0.18	0.16	0.50	0.00	0.00	0.38	0.09	3.34	2.29	5.63

Table VOC Two Wheelers 61
Financial Cost of Operation of Two Wheelers on Four Lane Divided Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
0	2.28	0.08	0.04	0.08	0.11	0.10	0.05	0.20	0.05	3.00	1.23	4.23
5	2.20	0.09	0.05	0.09	0.15	0.10	0.05	0.21	0.05	2.99	1.30	4.29
10	2.12	0.09	0.07	0.10	0.19	0.10	0.05	0.23	0.05	2.99	1.37	4.36
15	2.05	0.09	0.08	0.11	0.23	0.10	0.05	0.24	0.06	3.01	1.44	4.45
20	2.00	0.09	0.10	0.12	0.27	0.10	0.05	0.25	0.06	3.04	1.53	4.56
25	1.96	0.09	0.11	0.13	0.31	0.10	0.05	0.27	0.06	3.08	1.63	4.70
30	1.92	0.09	0.13	0.13	0.35	0.10	0.05	0.29	0.07	3.13	1.74	4.87
35	1.91	0.09	0.14	0.14	0.38	0.10	0.05	0.31	0.07	3.21	1.86	5.07
40	1.90	0.09	0.16	0.15	0.42	0.10	0.05	0.33	0.08	3.30	2.01	5.31
45	1.92	0.10	0.17	0.16	0.46	0.10	0.05	0.36	0.09	3.41	2.18	5.60
50	1.95	0.10	0.19	0.17	0.50	0.10	0.05	0.40	0.09	3.55	2.39	5.94

Table VOC Two Wheelers 62 Financial Cost of Operation of Two Wheelers on Four Lane Divided Expressways Roads (Rs/km) Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.23	0.09	0.04	0.09	0.11	0.25	0.14	0.21	0.05	3.21	1.26	4.47
5	2.15	0.09	0.06	0.10	0.15	0.25	0.14	0.22	0.05	3.21	1.33	4.53
10	2.08	0.09	0.07	0.11	0.19	0.25	0.14	0.23	0.05	3.21	1.40	4.61
15	2.02	0.09	0.09	0.12	0.23	0.25	0.14	0.25	0.06	3.23	1.48	4.72
20	1.97	0.10	0.10	0.13	0.27	0.25	0.14	0.26	0.06	3.27	1.57	4.84
25	1.93	0.10	0.12	0.14	0.31	0.25	0.14	0.28	0.07	3.32	1.68	4.99
30	1.91	0.10	0.13	0.14	0.35	0.25	0.14	0.30	0.07	3.38	1.80	5.18
35	1.90	0.10	0.15	0.15	0.38	0.25	0.14	0.32	0.08	3.46	1.93	5.39
40	1.90	0.10	0.16	0.16	0.42	0.25	0.14	0.35	0.08	3.56	2.09	5.65
45	1.93	0.10	0.18	0.17	0.46	0.25	0.14	0.38	0.09	3.69	2.28	5.97
50	1.97	0.11	0.19	0.18	0.50	0.25	0.14	0.41	0.10	3.85	2.50	6.35

Table VOC Two Wheelers 63
Financial Cost of Operation of Two Wheelers on Six Lane Divided Expressways Roads (Rs/km)
Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.38	0.08	0.02	0.07	0.11	0.00	0.00	0.20	0.05	2.90	1.18	4.09
5	2.29	0.08	0.04	0.08	0.15	0.00	0.00	0.21	0.05	2.89	1.24	4.13
10	2.20	0.08	0.06	0.08	0.19	0.00	0.00	0.22	0.05	2.88	1.31	4.18
15	2.13	0.08	0.07	0.09	0.23	0.00	0.00	0.23	0.05	2.88	1.38	4.26
20	2.07	0.08	0.09	0.10	0.27	0.00	0.00	0.24	0.06	2.90	1.45	4.35
25	2.01	0.08	0.10	0.11	0.31	0.00	0.00	0.26	0.06	2.93	1.54	4.47
30	1.97	0.08	0.12	0.12	0.35	0.00	0.00	0.27	0.06	2.97	1.64	4.61
35	1.94	0.08	0.13	0.13	0.38	0.00	0.00	0.29	0.07	3.03	1.75	4.78
40	1.93	0.08	0.15	0.14	0.42	0.00	0.00	0.31	0.07	3.10	1.88	4.99
45	1.92	0.08	0.16	0.15	0.46	0.00	0.00	0.34	0.08	3.20	2.03	5.23
50	1.94	0.09	0.18	0.15	0.50	0.00	0.00	0.37	0.09	3.31	2.21	5.52

Table VOC Two Wheelers 64
Financial Cost of Operation of Two Wheelers on Six Lane Divided Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.08	0.03	0.07	0.11	0.10	0.05	0.20	0.05	3.02	1.21	4.24
5	2.24	0.08	0.04	0.08	0.15	0.10	0.05	0.21	0.05	3.01	1.27	4.28
10	2.16	0.08	0.06	0.09	0.19	0.10	0.05	0.22	0.05	3.01	1.34	4.35
15	2.09	0.08	0.07	0.10	0.23	0.10	0.05	0.23	0.06	3.02	1.41	4.43
20	2.03	0.08	0.09	0.11	0.27	0.10	0.05	0.25	0.06	3.04	1.49	4.54
25	1.99	0.08	0.11	0.12	0.31	0.10	0.05	0.26	0.06	3.08	1.59	4.66
30	1.95	0.09	0.12	0.13	0.35	0.10	0.05	0.28	0.07	3.13	1.69	4.82
35	1.93	0.09	0.14	0.13	0.38	0.10	0.05	0.30	0.07	3.19	1.81	5.01
40	1.92	0.09	0.15	0.14	0.42	0.10	0.05	0.32	0.08	3.28	1.95	5.23
45	1.93	0.09	0.17	0.15	0.46	0.10	0.05	0.35	0.08	3.38	2.11	5.50
50	1.95	0.09	0.18	0.16	0.50	0.10	0.05	0.38	0.09	3.51	2.31	5.82

Table VOC Two Wheelers 65
Financial Cost of Operation of Two Wheelers on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.28	0.08	0.03	0.08	0.11	0.25	0.14	0.21	0.05	3.22	1.24	4.46
5	2.20	0.08	0.05	0.09	0.15	0.25	0.14	0.22	0.05	3.22	1.30	4.52
10	2.12	0.08	0.06	0.10	0.19	0.25	0.14	0.23	0.05	3.22	1.37	4.59
15	2.06	0.09	0.08	0.11	0.23	0.25	0.14	0.24	0.06	3.23	1.45	4.68
20	2.00	0.09	0.09	0.11	0.27	0.25	0.14	0.25	0.06	3.26	1.54	4.80
25	1.96	0.09	0.11	0.12	0.31	0.25	0.14	0.27	0.06	3.30	1.64	4.94
30	1.93	0.09	0.12	0.13	0.35	0.25	0.14	0.29	0.07	3.36	1.75	5.11
35	1.91	0.09	0.14	0.14	0.38	0.25	0.14	0.31	0.07	3.44	1.88	5.31
40	1.91	0.09	0.16	0.15	0.42	0.25	0.14	0.34	0.08	3.53	2.03	5.56
45	1.93	0.09	0.17	0.16	0.46	0.25	0.14	0.37	0.09	3.65	2.20	5.85
50	1.97	0.09	0.19	0.17	0.50	0.25	0.14	0.40	0.09	3.79	2.41	6.20

Table VOC Two Wheelers 66
Financial Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.44	0.07	0.02	0.06	0.11	0.00	0.00	0.19	0.05	2.95	1.16	4.11
5	2.34	0.08	0.04	0.07	0.15	0.00	0.00	0.20	0.05	2.92	1.22	4.14
10	2.25	0.08	0.05	0.08	0.19	0.00	0.00	0.21	0.05	2.91	1.28	4.19
15	2.17	0.08	0.07	0.09	0.23	0.00	0.00	0.22	0.05	2.91	1.35	4.26
20	2.10	0.08	0.08	0.10	0.27	0.00	0.00	0.24	0.06	2.92	1.42	4.35
25	2.05	0.08	0.10	0.11	0.31	0.00	0.00	0.25	0.06	2.95	1.51	4.45
30	2.00	0.08	0.11	0.12	0.35	0.00	0.00	0.27	0.06	2.98	1.60	4.58
35	1.96	0.08	0.13	0.13	0.38	0.00	0.00	0.28	0.07	3.03	1.71	4.74
40	1.94	0.08	0.14	0.13	0.42	0.00	0.00	0.30	0.07	3.10	1.83	4.94
45	1.94	0.08	0.16	0.14	0.46	0.00	0.00	0.33	0.08	3.19	1.97	5.16
50	1.95	0.08	0.17	0.15	0.50	0.00	0.00	0.35	0.08	3.30	2.14	5.44

Table VOC Two Wheelers 67
Financial Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	,	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.38	0.08	0.03	0.07	0.11	0.10	0.05	0.20	0.05	3.06	1.19	4.25
5	2.29	0.08	0.04	0.08	0.15	0.10	0.05	0.21	0.05	3.04	1.25	4.29
10	2.21	0.08	0.06	0.09	0.19	0.10	0.05	0.22	0.05	3.04	1.31	4.35
15	2.13	0.08	0.07	0.10	0.23	0.10	0.05	0.23	0.05	3.04	1.38	4.42
20	2.07	0.08	0.09	0.10	0.27	0.10	0.05	0.24	0.06	3.06	1.46	4.52
25	2.02	0.08	0.10	0.11	0.31	0.10	0.05	0.26	0.06	3.09	1.55	4.64
30	1.98	0.08	0.12	0.12	0.35	0.10	0.05	0.27	0.06	3.13	1.65	4.78
35	1.95	0.08	0.13	0.13	0.38	0.10	0.05	0.29	0.07	3.19	1.77	4.96
40	1.93	0.08	0.15	0.14	0.42	0.10	0.05	0.31	0.07	3.27	1.90	5.17
45	1.93	0.09	0.16	0.15	0.46	0.10	0.05	0.34	80.0	3.37	2.05	5.42
50	1.95	0.09	0.18	0.16	0.50	0.10	0.05	0.37	0.09	3.49	2.23	5.71

Table VOC Two Wheelers 68
Financial Cost of Operation of Two Wheelers on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF	Fuel Cost	,		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost		Grand Cost
			COST	COST		COST						
0	2.33	0.08	0.03	0.07	0.11	0.25	0.14	0.20	0.05	3.25	1.22	4.47
5	2.24	0.08	0.04	0.08	0.15	0.25	0.14	0.21	0.05	3.24	1.28	4.52
10	2.16	0.08	0.06	0.09	0.19	0.25	0.14	0.22	0.05	3.24	1.34	4.59
15	2.10	0.08	0.07	0.10	0.23	0.25	0.14	0.24	0.06	3.25	1.42	4.67
20	2.04	0.08	0.09	0.11	0.27	0.25	0.14	0.25	0.06	3.27	1.50	4.78
25	1.99	0.08	0.11	0.12	0.31	0.25	0.14	0.26	0.06	3.31	1.60	4.91
30	1.96	0.09	0.12	0.13	0.35	0.25	0.14	0.28	0.07	3.36	1.70	5.07
35	1.93	0.09	0.14	0.13	0.38	0.25	0.14	0.30	0.07	3.43	1.83	5.26
40	1.93	0.09	0.15	0.14	0.42	0.25	0.14	0.33	0.08	3.52	1.97	5.48
45	1.94	0.09	0.17	0.15	0.46	0.25	0.14	0.35	0.08	3.62	2.13	5.75
50	1.96	0.09	0.18	0.16	0.50	0.25	0.14	0.39	0.09	3.75	2.33	6.08

Table VOC Buses 1 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.20	2.04	0.16	0.06	0.12	1.79	2.10	1.28	0.37	6.27	19.40	15.80	35.20
5	5.44	2.15	0.16	0.06	0.12	1.85	2.18	1.33	0.38	6.52	20.21	16.42	36.62
10	5.70	2.27	0.16	0.06	0.12	1.92	2.27	1.39	0.40	6.78	21.07	17.09	38.16
15	5.96	2.40	0.16	0.06	0.13	2.00	2.35	1.45	0.41	7.07	21.99	17.81	39.81
20	6.25	2.54	0.17	0.06	0.13	2.07	2.44	1.51	0.43	7.39	22.99	18.60	41.59
25	6.55	2.71	0.17	0.06	0.13	2.15	2.53	1.58	0.45	7.73	24.06	19.46	43.53
30	6.87	2.90	0.17	0.06	0.14	2.23	2.63	1.66	0.47	8.10	25.23	20.41	45.64
35	7.22	3.12	0.17	0.06	0.14	2.31	2.72	1.74	0.50	8.52	26.50	21.45	47.96
40	7.59	3.37	0.17	0.06	0.14	2.40	2.83	1.84	0.53	8.98	27.90	22.61	50.51
45	7.99	3.67	0.17	0.06	0.14	2.49	2.93	1.94	0.56	9.49	29.45	23.90	53.34
50	8.42	4.02	0.17	0.06	0.15	2.58	3.04	2.06	0.59	10.06	31.17	25.34	56.51

Table VOC Buses 2 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.23	2.11	0.20	0.08	0.12	1.92	2.26	1.33	0.38	6.49	20.12	16.35	36.47
5	5.49	2.23	0.20	0.08	0.12	1.99	2.35	1.38	0.40	6.75	20.98	17.01	37.99
10	5.75	2.35	0.20	0.08	0.12	2.07	2.44	1.44	0.41	7.04	21.90	17.73	39.63
15	6.04	2.49	0.20	0.08	0.13	2.14	2.53	1.50	0.43	7.35	22.89	18.51	41.41
20	6.34	2.65	0.21	0.08	0.13	2.23	2.62	1.57	0.45	7.69	23.96	19.37	43.33
25	6.66	2.84	0.21	0.08	0.13	2.31	2.72	1.65	0.47	8.06	25.12	20.30	45.43
30	7.00	3.04	0.21	0.08	0.14	2.40	2.82	1.73	0.50	8.47	26.38	21.34	47.72
35	7.37	3.28	0.21	0.08	0.14	2.49	2.93	1.83	0.52	8.93	27.76	22.48	50.24
40	7.76	3.57	0.21	0.08	0.14	2.58	3.04	1.93	0.55	9.43	29.29	23.75	53.04
45	8.19	3.90	0.21	0.08	0.14	2.68	3.15	2.05	0.59	10.00	30.98	25.18	56.16
50	8.66	4.31	0.21	0.08	0.15	2.78	3.27	2.18	0.62	10.63	32.89	26.79	59.67

Table VOC Buses 3 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.28	2.19	0.24	0.09	0.12	2.06	2.43	1.38	0.39	6.72	20.90	16.94	37.84
5	5.54	2.31	0.24	0.09	0.12	2.14	2.52	1.43	0.41	7.01	21.82	17.65	39.47
10	5.82	2.45	0.24	0.09	0.12	2.22	2.62	1.50	0.43	7.32	22.81	18.43	41.23
15	6.12	2.60	0.24	0.09	0.13	2.31	2.72	1.57	0.45	7.65	23.87	19.27	43.14
20	6.44	2.77	0.24	0.09	0.13	2.39	2.82	1.64	0.47	8.02	25.02	20.20	45.22
25	6.78	2.97	0.25	0.09	0.13	2.48	2.92	1.72	0.49	8.43	26.27	21.22	47.49
30	7.14	3.20	0.25	0.09	0.14	2.58	3.03	1.82	0.52	8.87	27.64	22.35	49.99
35	7.54	3.47	0.25	0.09	0.14	2.67	3.15	1.92	0.55	9.37	29.15	23.61	52.76
40	7.96	3.79	0.25	0.09	0.14	2.77	3.27	2.03	0.58	9.93	30.82	25.02	55.84
45	8.43	4.17	0.25	0.09	0.14	2.88	3.39	2.16	0.62	10.56	32.69	26.60	59.29
50	8.94	4.63	0.25	0.09	0.15	2.98	3.52	2.31	0.66	11.28	34.81	28.40	63.21

Table VOC Buses 4 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.33	2.27	0.28	0.10	0.12	2.22	2.61	1.43	0.41	6.98	21.75	17.57	39.32
5	5.61	2.40	0.28	0.10	0.12	2.30	2.71	1.49	0.43	7.28	22.73	18.34	41.07
10	5.91	2.55	0.28	0.10	0.12	2.39	2.81	1.56	0.45	7.61	23.79	19.18	42.96
15	6.22	2.72	0.28	0.10	0.13	2.48	2.92	1.63	0.47	7.98	24.93	20.10	45.02
20	6.56	2.91	0.28	0.10	0.13	2.57	3.03	1.72	0.49	8.38	26.17	21.11	47.28
25	6.92	3.13	0.29	0.11	0.13	2.67	3.14	1.81	0.52	8.82	27.53	22.22	49.75
30	7.31	3.38	0.29	0.11	0.14	2.77	3.26	1.91	0.55	9.32	29.02	23.47	52.48
35	7.73	3.68	0.29	0.11	0.14	2.87	3.38	2.02	0.58	9.87	30.67	24.86	55.53
40	8.19	4.04	0.29	0.11	0.14	2.98	3.51	2.15	0.61	10.49	32.51	26.42	58.93
45	8.70	4.47	0.29	0.11	0.14	3.09	3.64	2.29	0.66	11.20	34.59	28.20	62.79
50	9.26	5.01	0.29	0.11	0.15	3.21	3.78	2.46	0.70	12.00	36.97	30.23	67.20

Table VOC Buses 5 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.40	2.36	0.32	0.12	0.12	2.39	2.81	1.48	0.42	7.25	22.66	18.25	40.91
5	5.69	2.50	0.32	0.12	0.12	2.48	2.92	1.55	0.44	7.58	23.71	19.08	42.80
10	6.01	2.66	0.32	0.12	0.12	2.57	3.03	1.62	0.46	7.94	24.85	19.99	44.84
15	6.34	2.84	0.32	0.12	0.13	2.66	3.14	1.71	0.49	8.33	26.08	20.99	47.07
20	6.70	3.05	0.32	0.12	0.13	2.76	3.26	1.80	0.51	8.77	27.43	22.10	49.53
25	7.09	3.29	0.33	0.12	0.13	2.87	3.38	1.90	0.54	9.26	28.90	23.33	52.23
30	7.50	3.58	0.33	0.12	0.14	2.98	3.51	2.01	0.57	9.81	30.53	24.70	55.23
35	7.96	3.91	0.33	0.12	0.14	3.09	3.64	2.13	0.61	10.42	32.35	26.24	58.59
40	8.46	4.32	0.33	0.12	0.14	3.20	3.77	2.28	0.65	11.12	34.39	28.00	62.39
45	9.01	4.82	0.33	0.12	0.14	3.32	3.92	2.44	0.70	11.91	36.72	30.00	66.72
50	9.63	5.46	0.33	0.12	0.15	3.45	4.06	2.63	0.75	12.83	39.41	32.31	71.71

Table VOC Buses 6 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.48	2.45	0.36	0.13	0.12	2.56	3.02	1.54	0.44	7.54	23.65	18.99	42.64
5	5.79	2.61	0.36	0.13	0.12	2.66	3.13	1.62	0.46	7.90	24.78	19.89	44.67
10	6.12	2.78	0.36	0.13	0.12	2.76	3.25	1.70	0.49	8.29	26.00	20.88	46.88
15	6.48	2.98	0.36	0.13	0.13	2.86	3.37	1.79	0.51	8.72	27.34	21.97	49.31
20	6.86	3.21	0.36	0.13	0.13	2.97	3.50	1.88	0.54	9.21	28.80	23.19	51.99
25	7.28	3.48	0.36	0.13	0.13	3.08	3.63	1.99	0.57	9.74	30.41	24.54	54.96
30	7.73	3.80	0.37	0.13	0.14	3.20	3.77	2.12	0.61	10.35	32.20	26.07	58.27
35	8.22	4.18	0.37	0.13	0.14	3.32	3.91	2.26	0.65	11.04	34.21	27.80	62.01
40	8.77	4.65	0.37	0.13	0.14	3.44	4.06	2.42	0.69	11.82	36.50	29.77	66.26
45	9.38	5.24	0.37	0.13	0.14	3.57	4.21	2.60	0.74	12.72	39.12	32.04	71.16
50	10.07	5.99	0.37	0.13	0.15	3.71	4.37	2.82	0.81	13.77	42.19	34.69	76.88

Table VOC Buses 7 Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.58	2.55	0.40	0.15	0.12	2.76	3.25	1.61	0.46	7.86	24.72	19.79	44.51
5	5.90	2.72	0.40	0.15	0.12	2.86	3.37	1.69	0.48	8.25	25.94	20.77	46.71
10	6.26	2.91	0.40	0.15	0.12	2.97	3.50	1.78	0.51	8.68	27.26	21.85	49.11
15	6.64	3.13	0.40	0.15	0.13	3.08	3.63	1.87	0.54	9.15	28.71	23.05	51.76
20	7.05	3.39	0.40	0.15	0.13	3.19	3.76	1.98	0.57	9.68	30.31	24.39	54.70
25	7.50	3.69	0.40	0.15	0.13	3.31	3.90	2.10	0.60	10.28	32.08	25.90	57.97
30	7.99	4.05	0.41	0.15	0.14	3.44	4.05	2.24	0.64	10.96	34.06	27.60	61.66
35	8.53	4.49	0.41	0.15	0.14	3.57	4.20	2.40	0.69	11.73	36.30	29.54	65.84
40	9.13	5.03	0.41	0.15	0.14	3.70	4.36	2.58	0.74	12.62	38.86	31.78	70.64
45	9.81	5.73	0.41	0.15	0.14	3.84	4.53	2.79	0.80	13.65	41.85	34.38	76.24
50	10.60	6.64	0.41	0.15	0.15	3.99	4.70	3.04	0.87	14.87	45.41	37.45	82.87

Table VOC Buses 8 Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.29	1.96	0.13	0.06	0.13	1.52	1.79	1.16	0.33	5.65	18.01	14.23	32.25
5	5.49	2.06	0.14	0.06	0.13	1.57	1.85	1.20	0.34	5.87	18.72	14.78	33.50
10	5.71	2.16	0.14	0.06	0.13	1.63	1.92	1.25	0.36	6.10	19.47	15.37	34.84
15	5.94	2.28	0.14	0.06	0.14	1.69	2.00	1.30	0.37	6.36	20.28	16.01	36.29
20	6.18	2.41	0.14	0.06	0.14	1.76	2.07	1.36	0.39	6.63	21.15	16.70	37.85
25	6.44	2.56	0.14	0.06	0.14	1.82	2.15	1.42	0.41	6.93	22.09	17.46	39.55
30	6.72	2.73	0.14	0.06	0.15	1.89	2.23	1.49	0.43	7.26	23.11	18.29	41.40
35	7.02	2.92	0.14	0.06	0.15	1.96	2.31	1.56	0.45	7.63	24.22	19.21	43.42
40	7.35	3.14	0.15	0.06	0.15	2.04	2.40	1.64	0.47	8.03	25.43	20.21	45.65
45	7.70	3.40	0.15	0.06	0.16	2.11	2.49	1.73	0.50	8.47	26.77	21.33	48.11
50	8.08	3.71	0.15	0.06	0.16	2.19	2.58	1.84	0.52	8.97	28.26	22.59	50.85

Table VOC Buses 9
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.30	2.02	0.16	0.08	0.13	1.63	1.92	1.18	0.34	5.78	18.54	14.56	33.11
5	5.51	2.13	0.16	0.08	0.13	1.69	1.99	1.23	0.35	6.01	19.28	15.14	34.42
10	5.73	2.24	0.16	0.08	0.13	1.76	2.07	1.28	0.37	6.26	20.08	15.75	35.83
15	5.97	2.37	0.17	0.08	0.14	1.82	2.15	1.34	0.38	6.52	20.93	16.43	37.36
20	6.23	2.51	0.17	0.08	0.14	1.89	2.23	1.39	0.40	6.81	21.85	17.16	39.01
25	6.50	2.67	0.17	0.08	0.14	1.96	2.31	1.46	0.42	7.13	22.84	17.96	40.80
30	6.79	2.86	0.17	0.08	0.15	2.03	2.40	1.53	0.44	7.48	23.93	18.84	42.76
35	7.11	3.07	0.17	0.08	0.15	2.11	2.49	1.61	0.46	7.86	25.11	19.81	44.92
40	7.45	3.31	0.17	0.08	0.15	2.19	2.58	1.70	0.49	8.29	26.41	20.88	47.29
45	7.81	3.60	0.17	0.08	0.16	2.27	2.68	1.79	0.51	8.77	27.85	22.08	49.93
50	8.21	3.95	0.18	0.08	0.16	2.36	2.78	1.90	0.54	9.30	29.46	23.43	52.88

Table VOC Buses 10 Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.31	2.09	0.19	0.09	0.13	1.75	2.07	1.21	0.35	5.92	19.11	14.91	34.01
5	5.53	2.20	0.19	0.09	0.13	1.82	2.14	1.26	0.36	6.16	19.89	15.51	35.39
10	5.76	2.33	0.19	0.09	0.13	1.89	2.22	1.31	0.38	6.42	20.72	16.16	36.88
15	6.01	2.46	0.19	0.09	0.14	1.96	2.31	1.37	0.39	6.70	21.62	16.87	38.49
20	6.28	2.62	0.19	0.09	0.14	2.03	2.39	1.43	0.41	7.00	22.60	17.64	40.24
25	6.56	2.80	0.20	0.09	0.14	2.11	2.48	1.50	0.43	7.34	23.65	18.49	42.14
30	6.87	3.00	0.20	0.09	0.15	2.19	2.58	1.58	0.45	7.71	24.81	19.42	44.23
35	7.20	3.23	0.20	0.09	0.15	2.27	2.67	1.66	0.48	8.12	26.07	20.45	46.52
40	7.55	3.50	0.20	0.09	0.15	2.35	2.77	1.76	0.50	8.58	27.47	21.60	49.06
45	7.94	3.83	0.20	0.09	0.16	2.44	2.88	1.86	0.53	9.08	29.02	22.88	51.90
50	8.36	4.22	0.20	0.09	0.16	2.53	2.99	1.98	0.57	9.66	30.76	24.33	55.09

Table VOC Buses 11
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.33	2.17	0.22	0.10	0.13	1.88	2.22	1.24	0.35	6.06	19.71	15.27	34.98
5	5.56	2.29	0.22	0.10	0.13	1.96	2.30	1.29	0.37	6.31	20.53	15.90	36.43
10	5.80	2.42	0.22	0.10	0.13	2.03	2.39	1.35	0.39	6.58	21.41	16.58	38.00
15	6.06	2.57	0.22	0.10	0.14	2.11	2.48	1.41	0.40	6.88	22.37	17.33	39.70
20	6.34	2.74	0.22	0.10	0.14	2.18	2.57	1.47	0.42	7.20	23.40	18.15	41.55
25	6.64	2.93	0.22	0.11	0.14	2.27	2.67	1.55	0.44	7.56	24.53	19.04	43.57
30	6.95	3.15	0.22	0.11	0.15	2.35	2.77	1.63	0.47	7.95	25.75	20.04	45.79
35	7.30	3.41	0.23	0.11	0.15	2.44	2.87	1.72	0.49	8.39	27.11	21.14	48.24
40	7.67	3.72	0.23	0.11	0.15	2.53	2.98	1.82	0.52	8.88	28.61	22.36	50.97
45	8.08	4.08	0.23	0.11	0.16	2.63	3.09	1.93	0.55	9.43	30.28	23.74	54.03
50	8.53	4.53	0.23	0.11	0.16	2.72	3.21	2.06	0.59	10.05	32.18	25.30	57.48

Table VOC Buses 12 Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.36	2.25	0.24	0.12	0.13	2.03	2.39	1.27	0.36	6.21	20.35	15.65	36.00
5	5.59	2.37	0.24	0.12	0.13	2.10	2.48	1.33	0.38	6.48	21.22	16.31	37.53
10	5.85	2.52	0.25	0.12	0.13	2.18	2.57	1.38	0.40	6.76	22.15	17.03	39.19
15	6.12	2.68	0.25	0.12	0.14	2.26	2.67	1.45	0.41	7.07	23.17	17.82	40.98
20	6.41	2.87	0.25	0.12	0.14	2.35	2.77	1.52	0.43	7.42	24.26	18.68	42.95
25	6.72	3.08	0.25	0.12	0.14	2.44	2.87	1.60	0.46	7.80	25.46	19.64	45.10
30	7.05	3.32	0.25	0.12	0.15	2.53	2.98	1.68	0.48	8.22	26.78	20.69	47.47
35	7.41	3.61	0.25	0.12	0.15	2.62	3.09	1.78	0.51	8.68	28.23	21.87	50.10
40	7.81	3.96	0.25	0.12	0.15	2.72	3.21	1.88	0.54	9.21	29.85	23.19	53.03
45	8.24	4.37	0.26	0.12	0.16	2.82	3.33	2.01	0.57	9.80	31.67	24.67	56.34
50	8.71	4.89	0.26	0.12	0.16	2.93	3.45	2.14	0.61	10.47	33.74	26.36	60.10

Table VOC Buses 13
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.39	2.33	0.27	0.13	0.13	2.18	2.57	1.30	0.37	6.37	21.04	16.04	37.08
5	5.63	2.47	0.27	0.13	0.13	2.26	2.66	1.36	0.39	6.65	21.96	16.74	38.70
10	5.90	2.63	0.27	0.13	0.13	2.34	2.76	1.42	0.41	6.95	22.95	17.50	40.45
15	6.18	2.80	0.27	0.13	0.14	2.43	2.87	1.49	0.43	7.28	24.02	18.34	42.36
20	6.48	3.01	0.28	0.13	0.14	2.52	2.97	1.57	0.45	7.64	25.19	19.25	44.44
25	6.80	3.24	0.28	0.13	0.14	2.62	3.09	1.65	0.47	8.05	26.47	20.27	46.74
30	7.16	3.51	0.28	0.13	0.15	2.72	3.20	1.74	0.50	8.49	27.88	21.40	49.27
35	7.54	3.84	0.28	0.13	0.15	2.82	3.32	1.84	0.53	8.99	29.44	22.65	52.10
40	7.95	4.23	0.28	0.13	0.15	2.93	3.45	1.96	0.56	9.56	31.20	24.07	55.27
45	8.41	4.71	0.28	0.13	0.16	3.03	3.58	2.09	0.60	10.19	33.18	25.68	58.86
50	8.92	5.31	0.28	0.13	0.16	3.15	3.71	2.24	0.64	10.92	35.47	27.51	62.98

Table VOC Buses 14
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.42	2.42	0.30	0.15	0.13	2.34	2.76	1.34	0.38	6.54	21.77	16.46	38.24
5	5.68	2.57	0.30	0.15	0.13	2.43	2.86	1.40	0.40	6.83	22.75	17.20	39.94
10	5.95	2.74	0.30	0.15	0.13	2.52	2.97	1.46	0.42	7.15	23.80	18.00	41.80
15	6.25	2.94	0.30	0.15	0.14	2.62	3.08	1.54	0.44	7.50	24.94	18.89	43.82
20	6.56	3.16	0.30	0.15	0.14	2.71	3.20	1.61	0.46	7.89	26.18	19.86	46.05
25	6.90	3.42	0.30	0.15	0.14	2.82	3.32	1.70	0.49	8.31	27.55	20.94	48.50
30	7.27	3.73	0.30	0.15	0.15	2.92	3.44	1.80	0.51	8.79	29.07	22.15	51.22
35	7.67	4.10	0.31	0.15	0.15	3.03	3.57	1.91	0.55	9.33	30.76	23.50	54.26
40	8.11	4.54	0.31	0.15	0.15	3.14	3.70	2.03	0.58	9.94	32.67	25.03	57.69
45	8.60	5.10	0.31	0.15	0.16	3.26	3.84	2.18	0.62	10.63	34.85	26.77	61.62
50	9.14	5.82	0.31	0.15	0.16	3.38	3.99	2.34	0.67	11.42	37.38	28.77	66.15

Table VOC Buses 15 Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.33	1.89	0.12	0.06	0.14	1.41	1.66	1.12	0.32	5.49	17.55	13.83	31.38
5	5.52	1.98	0.12	0.06	0.14	1.46	1.72	1.17	0.33	5.70	18.21	14.36	32.57
10	5.73	2.08	0.13	0.06	0.14	1.52	1.79	1.21	0.35	5.93	18.93	14.93	33.85
15	5.95	2.19	0.13	0.06	0.15	1.57	1.85	1.26	0.36	6.17	19.69	15.54	35.24
20	6.18	2.31	0.13	0.06	0.15	1.63	1.92	1.32	0.38	6.44	20.52	16.21	36.73
25	6.43	2.45	0.13	0.06	0.15	1.69	1.99	1.38	0.39	6.72	21.41	16.94	38.34
30	6.70	2.60	0.13	0.06	0.16	1.76	2.07	1.44	0.41	7.04	22.37	17.73	40.10
35	6.99	2.78	0.13	0.06	0.16	1.82	2.15	1.51	0.43	7.39	23.42	18.61	42.03
40	7.30	2.97	0.13	0.06	0.16	1.89	2.23	1.59	0.45	7.77	24.57	19.57	44.14
45	7.63	3.20	0.14	0.06	0.17	1.96	2.31	1.68	0.48	8.20	25.83	20.64	46.47
50	7.99	3.47	0.14	0.06	0.17	2.04	2.40	1.77	0.51	8.67	27.22	21.84	49.06

Table VOC Buses 16 Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.34	1.95	0.14	0.08	0.14	1.51	1.78	1.14	0.33	5.59	18.01	14.08	32.09
5	5.54	2.05	0.15	0.08	0.14	1.57	1.85	1.19	0.34	5.81	18.70	14.62	33.33
10	5.75	2.15	0.15	0.08	0.14	1.63	1.92	1.24	0.35	6.04	19.45	15.21	34.66
15	5.98	2.27	0.15	0.08	0.15	1.69	1.99	1.29	0.37	6.29	20.25	15.85	36.11
20	6.22	2.40	0.15	0.08	0.15	1.75	2.07	1.35	0.38	6.57	21.12	16.55	37.67
25	6.48	2.55	0.15	0.08	0.15	1.82	2.14	1.41	0.40	6.87	22.05	17.31	39.36
30	6.75	2.72	0.15	0.08	0.16	1.89	2.22	1.47	0.42	7.20	23.07	18.14	41.21
35	7.05	2.91	0.15	0.08	0.16	1.96	2.31	1.55	0.44	7.57	24.17	19.05	43.23
40	7.37	3.13	0.16	0.08	0.16	2.03	2.39	1.63	0.47	7.97	25.39	20.07	45.45
45	7.72	3.38	0.16	0.08	0.17	2.11	2.48	1.72	0.49	8.41	26.73	21.19	47.92
50	8.10	3.68	0.16	0.08	0.17	2.19	2.58	1.83	0.52	8.92	28.21	22.46	50.67

Table VOC Buses 17 Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.35	2.01	0.17	0.09	0.14	1.63	1.92	1.17	0.33	5.69	18.50	14.33	32.83
5	5.56	2.12	0.17	0.09	0.14	1.69	1.99	1.21	0.35	5.92	19.22	14.90	34.12
10	5.78	2.23	0.17	0.09	0.14	1.75	2.06	1.26	0.36	6.16	20.01	15.51	35.52
15	6.01	2.36	0.17	0.09	0.15	1.82	2.14	1.31	0.38	6.42	20.85	16.18	37.02
20	6.26	2.50	0.17	0.09	0.15	1.89	2.22	1.37	0.39	6.71	21.76	16.90	38.66
25	6.53	2.66	0.17	0.09	0.15	1.96	2.30	1.44	0.41	7.02	22.74	17.69	40.43
30	6.81	2.84	0.17	0.09	0.16	2.03	2.39	1.51	0.43	7.37	23.81	18.56	42.37
35	7.12	3.05	0.18	0.09	0.16	2.11	2.48	1.59	0.45	7.75	24.98	19.52	44.50
40	7.46	3.29	0.18	0.09	0.16	2.18	2.57	1.67	0.48	8.17	26.27	20.59	46.86
45	7.82	3.58	0.18	0.09	0.17	2.27	2.67	1.77	0.51	8.65	27.69	21.78	49.47
50	8.21	3.92	0.18	0.09	0.17	2.35	2.77	1.88	0.54	9.18	29.28	23.11	52.39

Table VOC Buses 18 Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

RF	Fuel Cost			Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.37	2.08	0.19	0.10	0.14	1.75	2.06	1.19	0.34	5.80	19.01	14.60	33.61
5	5.58	2.19	0.19	0.10	0.14	1.81	2.14	1.23	0.35	6.03	19.78	15.19	34.96
10	5.81	2.32	0.19	0.10	0.14	1.88	2.22	1.29	0.37	6.28	20.60	15.82	36.42
15	6.05	2.45	0.19	0.10	0.15	1.95	2.30	1.34	0.38	6.56	21.48	16.51	38.00
20	6.31	2.61	0.19	0.10	0.15	2.03	2.39	1.40	0.40	6.86	22.44	17.27	39.71
25	6.58	2.78	0.19	0.11	0.15	2.10	2.48	1.47	0.42	7.19	23.47	18.10	41.57
30	6.88	2.98	0.20	0.11	0.16	2.18	2.57	1.55	0.44	7.55	24.60	19.01	43.61
35	7.20	3.21	0.20	0.11	0.16	2.26	2.67	1.63	0.47	7.95	25.84	20.02	45.86
40	7.55	3.48	0.20	0.11	0.16	2.35	2.77	1.72	0.49	8.39	27.21	21.14	48.35
45	7.92	3.80	0.20	0.11	0.17	2.44	2.87	1.82	0.52	8.89	28.73	22.39	51.13
50	8.34	4.18	0.20	0.11	0.17	2.53	2.98	1.93	0.55	9.45	30.44	23.81	54.25

Table VOC Buses 19 Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	5.39	2.16	0.21	0.12	0.14	1.88	2.21	1.21	0.35	5.90	19.56	14.87	34.44
5	5.61	2.28	0.21	0.12	0.14	1.95	2.30	1.26	0.36	6.15	20.37	15.48	35.85
10	5.84	2.41	0.21	0.12	0.14	2.02	2.38	1.31	0.38	6.41	21.23	16.14	37.37
15	6.09	2.56	0.21	0.12	0.15	2.10	2.47	1.37	0.39	6.70	22.15	16.87	39.02
20	6.36	2.72	0.21	0.12	0.15	2.18	2.57	1.44	0.41	7.01	23.16	17.66	40.82
25	6.64	2.91	0.21	0.12	0.15	2.26	2.66	1.51	0.43	7.35	24.26	18.52	42.78
30	6.95	3.13	0.22	0.12	0.16	2.34	2.76	1.58	0.45	7.73	25.45	19.48	44.93
35	7.28	3.39	0.22	0.12	0.16	2.43	2.87	1.67	0.48	8.15	26.77	20.54	47.31
40	7.64	3.69	0.22	0.12	0.16	2.52	2.97	1.77	0.50	8.62	28.23	21.72	49.95
45	8.04	4.05	0.22	0.12	0.17	2.62	3.09	1.87	0.54	9.15	29.86	23.05	52.90
50	8.47	4.49	0.22	0.12	0.17	2.72	3.20	1.99	0.57	9.74	31.70	24.54	56.24

Table VOC Buses 20 Economic Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.20	1.89	0.12	0.06	0.14	1.41	1.66	0.86	0.25	4.20	16.79	10.58	27.37
5	6.37	1.98	0.12	0.06	0.14	1.46	1.72	0.87	0.25	4.26	17.25	10.74	27.99
10	6.55	2.08	0.13	0.06	0.14	1.52	1.79	0.89	0.25	4.33	17.73	10.90	28.63
15	6.72	2.19	0.13	0.06	0.15	1.57	1.85	0.90	0.26	4.39	18.23	11.06	29.29
20	6.90	2.31	0.13	0.06	0.15	1.63	1.92	0.91	0.26	4.46	18.75	11.24	29.98
25	7.09	2.45	0.13	0.06	0.15	1.69	1.99	0.93	0.27	4.53	19.29	11.41	30.71
30	7.27	2.60	0.13	0.06	0.16	1.76	2.07	0.94	0.27	4.60	19.87	11.60	31.46
35	7.46	2.78	0.13	0.06	0.16	1.82	2.15	0.96	0.27	4.68	20.47	11.78	32.25
40	7.65	2.97	0.13	0.06	0.16	1.89	2.23	0.97	0.28	4.76	21.11	11.98	33.09
45	7.84	3.20	0.14	0.06	0.17	1.96	2.31	0.99	0.28	4.84	21.79	12.18	33.97
50	8.03	3.47	0.14	0.06	0.17	2.04	2.40	1.01	0.29	4.92	22.52	12.39	34.91

Table VOC Buses 21
Economic Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.10	1.95	0.14	0.08	0.14	1.51	1.78	0.88	0.25	4.32	17.16	10.87	28.04
5	6.28	2.05	0.15	0.08	0.14	1.57	1.85	0.90	0.26	4.38	17.65	11.04	28.69
10	6.46	2.15	0.15	0.08	0.14	1.63	1.92	0.91	0.26	4.45	18.15	11.21	29.36
15	6.64	2.27	0.15	0.08	0.15	1.69	1.99	0.93	0.26	4.52	18.68	11.39	30.06
20	6.83	2.40	0.15	0.08	0.15	1.75	2.07	0.94	0.27	4.59	19.23	11.57	30.80
25	7.01	2.55	0.15	0.08	0.15	1.82	2.14	0.96	0.27	4.67	19.80	11.76	31.56
30	7.20	2.72	0.15	0.08	0.16	1.89	2.22	0.97	0.28	4.74	20.41	11.95	32.36
35	7.39	2.91	0.15	0.08	0.16	1.96	2.31	0.99	0.28	4.82	21.05	12.15	33.20
40	7.59	3.13	0.16	0.08	0.16	2.03	2.39	1.00	0.29	4.91	21.73	12.36	34.09
45	7.79	3.38	0.16	0.08	0.17	2.11	2.48	1.02	0.29	4.99	22.46	12.57	35.04
50	7.99	3.68	0.16	0.08	0.17	2.19	2.58	1.04	0.30	5.08	23.25	12.79	36.05

Table VOC Buses 22 Economic Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.02	2.01	0.17	0.09	0.14	1.63	1.92	0.91	0.26	4.44	17.58	11.18	28.76
5	6.20	2.12	0.17	0.09	0.14	1.69	1.99	0.92	0.26	4.51	18.09	11.36	29.45
10	6.38	2.23	0.17	0.09	0.14	1.75	2.06	0.94	0.27	4.58	18.62	11.54	30.16
15	6.57	2.36	0.17	0.09	0.15	1.82	2.14	0.95	0.27	4.66	19.17	11.73	30.90
20	6.76	2.50	0.17	0.09	0.15	1.89	2.22	0.97	0.28	4.73	19.75	11.92	31.67
25	6.95	2.66	0.17	0.09	0.15	1.96	2.30	0.99	0.28	4.81	20.37	12.12	32.48
30	7.14	2.84	0.17	0.09	0.16	2.03	2.39	1.00	0.29	4.89	21.01	12.33	33.33
35	7.34	3.05	0.18	0.09	0.16	2.11	2.48	1.02	0.29	4.98	21.69	12.54	34.23
40	7.54	3.29	0.18	0.09	0.16	2.18	2.57	1.04	0.30	5.07	22.42	12.76	35.18
45	7.74	3.58	0.18	0.09	0.17	2.27	2.67	1.06	0.30	5.16	23.21	12.99	36.19
50	7.95	3.92	0.18	0.09	0.17	2.35	2.77	1.07	0.31	5.25	24.06	13.22	37.28

Table VOC Buses 23 Economic Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.35	1.75	0.11	0.06	0.16	1.28	1.51	0.84	0.24	4.08	16.39	10.28	26.67
5	6.52	1.83	0.11	0.06	0.16	1.33	1.57	0.85	0.24	4.14	16.82	10.43	27.25
10	6.69	1.91	0.11	0.06	0.17	1.38	1.63	0.86	0.25	4.20	17.26	10.58	27.84
15	6.86	2.00	0.11	0.06	0.17	1.43	1.69	0.87	0.25	4.26	17.72	10.74	28.46
20	7.04	2.10	0.11	0.06	0.17	1.49	1.75	0.89	0.25	4.33	18.20	10.90	29.10
25	7.22	2.22	0.12	0.06	0.18	1.54	1.82	0.90	0.26	4.39	18.70	11.06	29.77
30	7.40	2.34	0.12	0.06	0.18	1.60	1.89	0.91	0.26	4.46	19.22	11.23	30.46
35	7.58	2.48	0.12	0.06	0.18	1.66	1.96	0.93	0.27	4.53	19.77	11.41	31.18
40	7.76	2.64	0.12	0.06	0.19	1.72	2.03	0.94	0.27	4.60	20.35	11.59	31.94
45	7.95	2.82	0.12	0.06	0.19	1.79	2.11	0.96	0.27	4.68	20.95	11.78	32.73
50	8.14	3.02	0.12	0.06	0.19	1.86	2.19	0.97	0.28	4.76	21.60	11.98	33.57

Table VOC Buses 24 Economic Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.25	1.80	0.12	0.08	0.16	1.38	1.63	0.86	0.25	4.19	16.71	10.56	27.27
5	6.42	1.88	0.12	0.08	0.16	1.43	1.69	0.87	0.25	4.25	17.16	10.71	27.88
10	6.60	1.97	0.13	0.08	0.17	1.49	1.75	0.88	0.25	4.32	17.63	10.87	28.50
15	6.77	2.07	0.13	0.08	0.17	1.54	1.82	0.90	0.26	4.38	18.11	11.04	29.15
20	6.95	2.18	0.13	0.08	0.17	1.60	1.88	0.91	0.26	4.45	18.62	11.21	29.83
25	7.13	2.30	0.13	0.08	0.18	1.66	1.96	0.93	0.26	4.52	19.14	11.38	30.53
30	7.32	2.43	0.13	0.08	0.18	1.72	2.03	0.94	0.27	4.59	19.70	11.57	31.26
35	7.50	2.59	0.13	0.08	0.18	1.79	2.11	0.96	0.27	4.67	20.27	11.75	32.03
40	7.69	2.76	0.13	0.08	0.19	1.85	2.18	0.97	0.28	4.74	20.88	11.95	32.83
45	7.89	2.95	0.14	0.08	0.19	1.92	2.27	0.99	0.28	4.82	21.53	12.15	33.68
50	8.08	3.18	0.14	0.08	0.19	2.00	2.35	1.00	0.29	4.91	22.21	12.35	34.57

Table VOC Buses 25 Economic Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.15	1.86	0.14	0.09	0.16	1.48	1.75	0.88	0.25	4.31	17.07	10.85	27.92
5	6.33	1.94	0.14	0.09	0.16	1.54	1.81	0.90	0.26	4.37	17.54	11.01	28.56
10	6.51	2.04	0.14	0.09	0.17	1.60	1.88	0.91	0.26	4.44	18.03	11.18	29.22
15	6.69	2.14	0.14	0.09	0.17	1.66	1.95	0.92	0.26	4.51	18.54	11.36	29.90
20	6.87	2.26	0.14	0.09	0.17	1.72	2.03	0.94	0.27	4.58	19.08	11.54	30.61
25	7.06	2.39	0.14	0.09	0.18	1.78	2.10	0.95	0.27	4.66	19.63	11.73	31.36
30	7.25	2.54	0.15	0.09	0.18	1.85	2.18	0.97	0.28	4.73	20.21	11.92	32.13
35	7.44	2.70	0.15	0.09	0.18	1.92	2.26	0.98	0.28	4.81	20.82	12.12	32.94
40	7.63	2.89	0.15	0.09	0.19	1.99	2.35	1.00	0.29	4.89	21.47	12.32	33.80
45	7.83	3.10	0.15	0.09	0.19	2.07	2.44	1.02	0.29	4.98	22.16	12.54	34.70
50	8.03	3.36	0.15	0.09	0.19	2.15	2.53	1.04	0.30	5.06	22.89	12.76	35.65

Table VOC Buses 26 Economic Cost of Operation of Buses on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	3	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.20	1.89	0.12	0.06	0.14	1.41	1.66	0.86	0.25	4.20	16.79	10.58	27.37
5	6.37	1.98	0.12	0.06	0.14	1.46	1.72	0.87	0.25	4.26	17.25	10.74	27.99
10	6.55	2.08	0.13	0.06	0.14	1.52	1.79	0.89	0.25	4.33	17.73	10.90	28.63
15	6.72	2.19	0.13	0.06	0.15	1.57	1.85	0.90	0.26	4.39	18.23	11.07	29.29
20	6.90	2.31	0.13	0.06	0.15	1.63	1.92	0.91	0.26	4.46	18.75	11.24	29.98
25	7.09	2.45	0.13	0.06	0.15	1.69	1.99	0.93	0.27	4.53	19.29	11.41	30.71
30	7.27	2.60	0.13	0.06	0.16	1.76	2.07	0.94	0.27	4.60	19.87	11.60	31.46
35	7.46	2.78	0.13	0.06	0.16	1.82	2.15	0.96	0.27	4.68	20.47	11.78	32.25
40	7.65	2.97	0.13	0.06	0.16	1.89	2.23	0.97	0.28	4.76	21.11	11.98	33.09
45	7.84	3.20	0.14	0.06	0.17	1.96	2.31	0.99	0.28	4.84	21.79	12.18	33.97
50	8.03	3.47	0.14	0.06	0.17	2.04	2.40	1.01	0.29	4.92	22.52	12.39	34.91

Table VOC Buses 27
Economic Cost of Operation of Buses on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.10	1.95	0.14	0.08	0.14	1.51	1.78	0.88	0.25	4.32	17.16	10.87	28.04
5	6.28	2.05	0.15	0.08	0.14	1.57	1.85	0.90	0.26	4.38	17.65	11.04	28.69
10	6.46	2.15	0.15	0.08	0.14	1.63	1.92	0.91	0.26	4.45	18.15	11.21	29.36
15	6.64	2.27	0.15	0.08	0.15	1.69	1.99	0.93	0.26	4.52	18.68	11.39	30.07
20	6.83	2.40	0.15	0.08	0.15	1.75	2.07	0.94	0.27	4.59	19.23	11.57	30.80
25	7.01	2.55	0.15	0.08	0.15	1.82	2.14	0.96	0.27	4.67	19.80	11.76	31.56
30	7.20	2.72	0.15	0.08	0.16	1.89	2.22	0.97	0.28	4.74	20.41	11.95	32.36
35	7.39	2.91	0.15	0.08	0.16	1.96	2.31	0.99	0.28	4.82	21.05	12.15	33.20
40	7.59	3.13	0.16	0.08	0.16	2.03	2.39	1.00	0.29	4.91	21.73	12.36	34.09
45	7.79	3.38	0.16	0.08	0.17	2.11	2.48	1.02	0.29	4.99	22.47	12.57	35.04
50	7.99	3.68	0.16	0.08	0.17	2.19	2.58	1.04	0.30	5.08	23.25	12.79	36.05

Table VOC Buses 28 Economic Cost of Operation of Buses on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.02	2.01	0.17	0.09	0.14	1.63	1.92	0.91	0.26	4.44	17.58	11.18	28.76
5	6.20	2.12	0.17	0.09	0.14	1.69	1.99	0.92	0.26	4.51	18.09	11.36	29.45
10	6.38	2.23	0.17	0.09	0.14	1.75	2.06	0.94	0.27	4.58	18.62	11.54	30.16
15	6.57	2.36	0.17	0.09	0.15	1.82	2.14	0.95	0.27	4.66	19.17	11.73	30.90
20	6.76	2.50	0.17	0.09	0.15	1.89	2.22	0.97	0.28	4.73	19.75	11.92	31.68
25	6.95	2.66	0.17	0.09	0.15	1.96	2.30	0.99	0.28	4.81	20.37	12.12	32.48
30	7.14	2.84	0.17	0.09	0.16	2.03	2.39	1.00	0.29	4.89	21.01	12.33	33.34
35	7.34	3.05	0.18	0.09	0.16	2.11	2.48	1.02	0.29	4.98	21.69	12.54	34.23
40	7.54	3.29	0.18	0.09	0.16	2.18	2.57	1.04	0.30	5.07	22.42	12.76	35.18
45	7.74	3.58	0.18	0.09	0.17	2.27	2.67	1.06	0.30	5.16	23.21	12.99	36.19
50	7.95	3.92	0.18	0.09	0.17	2.35	2.77	1.07	0.31	5.25	24.06	13.22	37.28

Table VOC Buses 29
Economic Cost of Operation of Buses on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.35	1.75	0.11	0.06	0.16	1.28	1.51	0.84	0.24	4.08	16.39	10.28	26.67
5	6.52	1.83	0.11	0.06	0.16	1.33	1.57	0.85	0.24	4.14	16.82	10.43	27.25
10	6.69	1.91	0.11	0.06	0.17	1.38	1.63	0.86	0.25	4.20	17.26	10.58	27.84
15	6.86	2.00	0.11	0.06	0.17	1.43	1.69	0.87	0.25	4.26	17.72	10.74	28.46
20	7.04	2.10	0.11	0.06	0.17	1.49	1.75	0.89	0.25	4.33	18.20	10.90	29.10
25	7.22	2.22	0.12	0.06	0.18	1.54	1.82	0.90	0.26	4.39	18.70	11.06	29.77
30	7.40	2.34	0.12	0.06	0.18	1.60	1.89	0.91	0.26	4.46	19.22	11.24	30.46
35	7.58	2.48	0.12	0.06	0.18	1.66	1.96	0.93	0.27	4.53	19.77	11.41	31.18
40	7.76	2.64	0.12	0.06	0.19	1.72	2.03	0.94	0.27	4.60	20.35	11.59	31.94
45	7.95	2.82	0.12	0.06	0.19	1.79	2.11	0.96	0.27	4.68	20.95	11.78	32.73
50	8.14	3.02	0.12	0.06	0.19	1.86	2.19	0.97	0.28	4.76	21.60	11.98	33.57

Table VOC Buses 30 Economic Cost of Operation of Buses on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	6.25	1.80	0.12	0.08	0.16	1.38	1.63	0.86	0.25	4.19	16.71	10.56	27.27
5	6.42	1.88	0.12	0.08	0.16	1.43	1.69	0.87	0.25	4.25	17.16	10.71	27.88
10	6.60	1.97	0.13	0.08	0.17	1.49	1.75	0.88	0.25	4.32	17.63	10.87	28.50
15	6.77	2.07	0.13	0.08	0.17	1.54	1.82	0.90	0.26	4.38	18.11	11.04	29.15
20	6.95	2.18	0.13	0.08	0.17	1.60	1.88	0.91	0.26	4.45	18.62	11.21	29.83
25	7.13	2.30	0.13	0.08	0.18	1.66	1.96	0.93	0.26	4.52	19.14	11.39	30.53
30	7.32	2.43	0.13	0.08	0.18	1.72	2.03	0.94	0.27	4.59	19.70	11.57	31.26
35	7.50	2.59	0.13	0.08	0.18	1.79	2.11	0.96	0.27	4.67	20.27	11.75	32.03
40	7.69	2.76	0.13	0.08	0.19	1.85	2.18	0.97	0.28	4.74	20.88	11.95	32.83
45	7.89	2.95	0.14	0.08	0.19	1.92	2.27	0.99	0.28	4.82	21.53	12.15	33.68
50	8.08	3.18	0.14	0.08	0.19	2.00	2.35	1.00	0.29	4.91	22.21	12.36	34.57

Table VOC Buses 35 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost		Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.38	2.65	0.33	0.13	0.25	2.31	2.72	2.35	0.59	6.27	29.98	15.80	45.78
5	12.95	2.79	0.33	0.13	0.26	2.40	2.82	2.44	0.61	6.52	31.25	16.42	47.67
10	13.55	2.94	0.33	0.13	0.26	2.49	2.93	2.54	0.64	6.78	32.60	17.09	49.69
15	14.19	3.11	0.34	0.13	0.27	2.58	3.04	2.65	0.67	7.07	34.04	17.81	51.86
20	14.87	3.30	0.34	0.13	0.27	2.68	3.15	2.77	0.70	7.39	35.59	18.60	54.19
25	15.59	3.52	0.34	0.13	0.28	2.78	3.27	2.90	0.73	7.73	37.26	19.46	56.73
30	16.36	3.77	0.34	0.13	0.29	2.88	3.39	3.04	0.76	8.10	39.06	20.41	59.47
35	17.18	4.05	0.35	0.13	0.29	2.99	3.52	3.19	0.80	8.52	41.02	21.45	62.47
40	18.06	4.38	0.35	0.13	0.30	3.10	3.65	3.36	0.85	8.98	43.16	22.61	65.77
45	19.01	4.76	0.35	0.13	0.31	3.22	3.79	3.56	0.89	9.49	45.51	23.90	69.41
50	20.04	5.23	0.36	0.13	0.31	3.34	3.93	3.77	0.95	10.06	48.12	25.34	73.46

Table VOC Buses 36 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.46	2.75	0.41	0.15	0.25	2.48	2.92	2.43	0.61	6.49	30.96	16.35	47.30
5	13.06	2.89	0.41	0.15	0.26	2.58	3.03	2.53	0.64	6.75	32.30	17.01	49.31
10	13.69	3.06	0.41	0.16	0.26	2.67	3.15	2.64	0.66	7.04	33.74	17.73	51.47
15	14.36	3.24	0.42	0.16	0.27	2.77	3.27	2.76	0.69	7.35	35.28	18.51	53.79
20	15.08	3.45	0.42	0.16	0.27	2.88	3.39	2.88	0.72	7.69	36.94	19.37	56.31
25	15.84	3.68	0.42	0.16	0.28	2.98	3.52	3.02	0.76	8.06	38.73	20.30	59.03
30	16.65	3.95	0.43	0.16	0.29	3.10	3.65	3.18	0.80	8.47	40.67	21.34	62.00
35	17.53	4.27	0.43	0.16	0.29	3.21	3.79	3.35	0.84	8.93	42.78	22.48	65.26
40	18.47	4.63	0.43	0.16	0.30	3.33	3.93	3.53	0.89	9.43	45.11	23.75	68.86
45	19.49	5.07	0.43	0.16	0.31	3.46	4.08	3.75	0.94	10.00	47.68	25.18	72.86
50	20.61	5.59	0.44	0.16	0.31	3.59	4.23	3.99	1.00	10.63	50.55	26.79	77.34

Table VOC Buses 37 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.56	2.84	0.49	0.18	0.25	2.67	3.14	2.52	0.63	6.72	32.01	16.94	48.95
5	13.19	3.00	0.49	0.18	0.26	2.77	3.26	2.63	0.66	7.01	33.45	17.65	51.10
10	13.86	3.18	0.49	0.18	0.26	2.87	3.38	2.74	0.69	7.32	34.98	18.43	53.40
15	14.57	3.38	0.50	0.18	0.27	2.98	3.51	2.87	0.72	7.65	36.63	19.27	55.90
20	15.32	3.60	0.50	0.18	0.27	3.09	3.64	3.01	0.76	8.02	38.40	20.20	58.60
25	16.13	3.86	0.50	0.18	0.28	3.21	3.78	3.16	0.79	8.43	40.33	21.22	61.55
30	17.00	4.16	0.51	0.18	0.29	3.33	3.92	3.33	0.84	8.87	42.43	22.35	64.78
35	17.93	4.51	0.51	0.19	0.29	3.45	4.07	3.51	0.88	9.37	44.72	23.61	68.33
40	18.95	4.92	0.51	0.19	0.30	3.58	4.22	3.72	0.94	9.93	47.26	25.02	72.28
45	20.05	5.41	0.51	0.19	0.31	3.72	4.38	3.96	1.00	10.56	50.09	26.60	76.69
50	21.27	6.02	0.52	0.19	0.31	3.86	4.55	4.23	1.06	11.28	53.27	28.40	81.68

Table VOC Buses 38 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.69	2.95	0.57	0.21	0.25	2.87	3.38	2.61	0.66	6.98	33.16	17.57	50.73
5	13.35	3.12	0.57	0.21	0.26	2.98	3.51	2.73	0.69	7.28	34.69	18.34	53.03
10	14.06	3.31	0.58	0.21	0.26	3.09	3.64	2.85	0.72	7.61	36.33	19.18	55.50
15	14.81	3.53	0.58	0.21	0.27	3.20	3.77	2.99	0.75	7.98	38.09	20.10	58.19
20	15.61	3.77	0.58	0.21	0.27	3.32	3.92	3.14	0.79	8.38	40.00	21.11	61.11
25	16.47	4.06	0.58	0.21	0.28	3.45	4.06	3.31	0.83	8.82	42.08	22.22	64.31
30	17.40	4.39	0.59	0.21	0.29	3.58	4.22	3.49	0.88	9.32	44.36	23.47	67.82
35	18.40	4.78	0.59	0.21	0.29	3.71	4.37	3.70	0.93	9.87	46.86	24.86	71.72
40	19.50	5.24	0.59	0.21	0.30	3.85	4.54	3.93	0.99	10.49	49.65	26.42	76.07
45	20.70	5.81	0.60	0.21	0.31	4.00	4.71	4.20	1.05	11.20	52.78	28.20	80.98
50	22.03	6.51	0.60	0.21	0.31	4.15	4.89	4.50	1.13	12.00	56.33	30.23	86.56

Table VOC Buses 39 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.85	3.06	0.65	0.24	0.25	3.08	3.63	2.72	0.68	7.25	34.41	18.25	52.66
5	13.55	3.25	0.65	0.24	0.26	3.20	3.77	2.84	0.71	7.58	36.04	19.08	55.12
10	14.30	3.45	0.66	0.24	0.26	3.32	3.91	2.98	0.75	7.94	37.80	19.99	57.79
15	15.09	3.69	0.66	0.24	0.27	3.44	4.06	3.12	0.79	8.33	39.69	20.99	60.69
20	15.95	3.96	0.66	0.24	0.27	3.57	4.21	3.29	0.83	8.77	41.76	22.10	63.85
25	16.86	4.28	0.66	0.24	0.28	3.71	4.37	3.47	0.87	9.26	44.01	23.33	67.34
30	17.86	4.65	0.67	0.24	0.29	3.85	4.53	3.68	0.92	9.81	46.49	24.70	71.19
35	18.94	5.08	0.67	0.24	0.29	3.99	4.70	3.91	0.98	10.42	49.23	26.24	75.48
40	20.13	5.61	0.67	0.24	0.30	4.14	4.88	4.17	1.05	11.12	52.31	28.00	80.31
45	21.45	6.26	0.68	0.24	0.31	4.30	5.06	4.46	1.12	11.91	55.80	30.00	85.79
50	22.93	7.09	0.68	0.24	0.31	4.46	5.25	4.81	1.21	12.83	59.80	32.31	92.11

Table VOC Buses 40 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	13.04	3.18	0.73	0.27	0.25	3.31	3.91	2.83	0.71	7.54	35.77	18.99	54.76
5	13.78	3.38	0.73	0.27	0.26	3.44	4.05	2.96	0.74	7.90	37.51	19.89	57.40
10	14.57	3.61	0.74	0.27	0.26	3.57	4.20	3.11	0.78	8.29	39.40	20.88	60.28
15	15.42	3.87	0.74	0.27	0.27	3.70	4.36	3.27	0.82	8.72	41.45	21.97	63.42
20	16.33	4.17	0.74	0.27	0.27	3.84	4.53	3.45	0.87	9.21	43.68	23.19	66.87
25	17.32	4.52	0.75	0.27	0.28	3.99	4.70	3.65	0.92	9.74	46.13	24.54	70.67
30	18.39	4.93	0.75	0.27	0.29	4.14	4.87	3.88	0.98	10.35	48.84	26.07	74.91
35	19.57	5.43	0.75	0.27	0.29	4.29	5.06	4.14	1.04	11.04	51.87	27.80	79.67
40	20.87	6.04	0.75	0.27	0.30	4.45	5.24	4.43	1.11	11.82	55.29	29.77	85.06
45	22.33	6.80	0.76	0.27	0.31	4.62	5.44	4.77	1.20	12.72	59.21	32.04	91.25
50	23.97	7.78	0.76	0.27	0.31	4.79	5.65	5.16	1.30	13.77	63.77	34.69	98.47

Table VOC Buses 41 Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 8000

RF		Tyre Cost	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	13.27	3.32	0.81	0.29	0.25	3.56	4.20	2.94	0.74	7.86	37.24	19.79	57.03
5	14.05	3.54	0.81	0.29	0.26	3.70	4.36	3.09	0.78	8.25	39.12	20.77	59.89
10	14.89	3.78	0.82	0.29	0.26	3.84	4.52	3.25	0.82	8.68	41.15	21.85	63.00
15	15.80	4.07	0.82	0.29	0.27	3.98	4.69	3.43	0.86	9.15	43.36	23.05	66.41
20	16.78	4.40	0.82	0.30	0.27	4.13	4.87	3.63	0.91	9.68	45.79	24.39	70.18
25	17.84	4.79	0.83	0.30	0.28	4.28	5.05	3.85	0.97	10.28	48.47	25.90	74.37
30	19.00	5.26	0.83	0.30	0.29	4.45	5.24	4.11	1.03	10.96	51.46	27.60	79.06
35	20.29	5.83	0.83	0.30	0.29	4.61	5.43	4.40	1.11	11.73	54.82	29.54	84.37
40	21.73	6.53	0.83	0.30	0.30	4.79	5.64	4.73	1.19	12.62	58.66	31.78	90.44
45	23.36	7.44	0.84	0.30	0.31	4.97	5.85	5.12	1.29	13.65	63.11	34.38	97.49
50	25.22	8.63	0.84	0.30	0.31	5.15	6.07	5.57	1.40	14.87	68.37	37.45	105.82

Table VOC Buses 42 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.58	2.54	0.28	0.13	0.27	1.96	2.31	2.12	0.53	5.65	28.38	14.23	42.61
5	13.07	2.67	0.28	0.13	0.28	2.03	2.40	2.20	0.55	5.87	29.47	14.78	44.25
10	13.58	2.81	0.28	0.13	0.29	2.11	2.49	2.29	0.57	6.10	30.65	15.37	46.02
15	14.13	2.96	0.28	0.13	0.29	2.19	2.58	2.38	0.60	6.36	31.90	16.01	47.91
20	14.71	3.13	0.29	0.13	0.30	2.27	2.68	2.49	0.62	6.63	33.25	16.70	49.96
25	15.33	3.33	0.29	0.13	0.31	2.36	2.78	2.60	0.65	6.93	34.71	17.46	52.17
30	16.00	3.55	0.29	0.13	0.31	2.45	2.88	2.72	0.68	7.26	36.28	18.29	54.57
35	16.71	3.80	0.30	0.13	0.32	2.54	2.99	2.86	0.72	7.63	37.99	19.21	57.19
40	17.48	4.08	0.30	0.13	0.33	2.63	3.10	3.01	0.76	8.03	39.85	20.21	60.06
45	18.32	4.42	0.30	0.13	0.33	2.73	3.22	3.17	0.80	8.47	41.90	21.33	63.23
50	19.22	4.81	0.30	0.13	0.34	2.84	3.34	3.36	0.84	8.97	44.16	22.59	66.74

Table VOC Buses 43 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.61	2.63	0.33	0.15	0.27	2.11	2.48	2.17	0.54	5.78	29.08	14.56	43.64
5	13.11	2.76	0.33	0.15	0.28	2.19	2.58	2.25	0.57	6.01	30.23	15.14	45.37
10	13.64	2.91	0.34	0.16	0.29	2.27	2.67	2.34	0.59	6.26	31.46	15.75	47.22
15	14.21	3.08	0.34	0.16	0.29	2.35	2.77	2.44	0.61	6.52	32.79	16.43	49.21
20	14.82	3.26	0.34	0.16	0.30	2.44	2.88	2.55	0.64	6.81	34.21	17.16	51.37
25	15.47	3.47	0.35	0.16	0.31	2.54	2.99	2.67	0.67	7.13	35.75	17.96	53.71
30	16.16	3.71	0.35	0.16	0.31	2.63	3.10	2.80	0.70	7.48	37.41	18.84	56.25
35	16.91	3.99	0.35	0.16	0.32	2.73	3.22	2.95	0.74	7.86	39.22	19.81	59.03
40	17.72	4.31	0.35	0.16	0.33	2.83	3.34	3.11	0.78	8.29	41.21	20.88	62.09
45	18.59	4.68	0.36	0.16	0.33	2.94	3.46	3.29	0.83	8.77	43.40	22.08	65.48
50	19.54	5.12	0.36	0.16	0.34	3.05	3.59	3.49	0.88	9.30	45.83	23.43	69.25

Table VOC Buses 44 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.64	2.72	0.39	0.18	0.27	2.27	2.67	2.22	0.56	5.92	29.83	14.91	44.74
5	13.16	2.86	0.39	0.18	0.28	2.35	2.77	2.31	0.58	6.16	31.04	15.51	46.55
10	13.72	3.02	0.39	0.18	0.29	2.44	2.87	2.40	0.60	6.42	32.34	16.16	48.50
15	14.31	3.20	0.39	0.18	0.29	2.53	2.98	2.51	0.63	6.70	33.73	16.87	50.60
20	14.94	3.40	0.40	0.18	0.30	2.63	3.09	2.63	0.66	7.00	35.24	17.64	52.87
25	15.62	3.63	0.40	0.18	0.31	2.73	3.21	2.75	0.69	7.34	36.86	18.49	55.35
30	16.35	3.89	0.40	0.18	0.31	2.83	3.33	2.89	0.73	7.71	38.63	19.42	58.05
35	17.13	4.20	0.41	0.19	0.32	2.93	3.46	3.04	0.77	8.12	40.56	20.45	61.01
40	17.98	4.55	0.41	0.19	0.33	3.04	3.59	3.21	0.81	8.58	42.68	21.60	64.27
45	18.90	4.97	0.41	0.19	0.33	3.16	3.72	3.41	0.86	9.08	45.02	22.88	67.91
50	19.90	5.48	0.41	0.19	0.34	3.28	3.86	3.62	0.91	9.66	47.65	24.33	71.98

Table VOC Buses 45 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.69	2.81	0.44	0.21	0.27	2.44	2.87	2.27	0.57	6.06	30.64	15.27	45.91
5	13.23	2.97	0.44	0.21	0.28	2.53	2.98	2.37	0.59	6.31	31.91	15.90	47.81
10	13.81	3.14	0.45	0.21	0.29	2.62	3.09	2.47	0.62	6.58	33.28	16.58	49.86
15	14.43	3.33	0.45	0.21	0.29	2.72	3.21	2.58	0.65	6.88	34.75	17.33	52.08
20	15.08	3.55	0.45	0.21	0.30	2.82	3.33	2.70	0.68	7.20	36.34	18.15	54.48
25	15.79	3.81	0.46	0.21	0.31	2.93	3.45	2.83	0.71	7.56	38.06	19.04	57.10
30	16.55	4.09	0.46	0.21	0.31	3.04	3.58	2.98	0.75	7.95	39.94	20.04	59.97
35	17.37	4.43	0.46	0.21	0.32	3.15	3.72	3.15	0.79	8.39	41.99	21.14	63.13
40	18.26	4.83	0.46	0.21	0.33	3.27	3.85	3.33	0.84	8.88	44.27	22.36	66.63
45	19.23	5.30	0.47	0.21	0.33	3.39	4.00	3.53	0.89	9.43	46.79	23.74	70.54
50	20.30	5.88	0.47	0.21	0.34	3.52	4.15	3.77	0.95	10.05	49.63	25.30	74.94

Table VOC Buses 46 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.75	2.92	0.50	0.24	0.27	2.62	3.09	2.33	0.59	6.21	31.50	15.65	47.15
5	13.31	3.08	0.50	0.24	0.28	2.72	3.20	2.43	0.61	6.48	32.84	16.31	49.15
10	13.91	3.27	0.50	0.24	0.29	2.82	3.32	2.53	0.64	6.76	34.28	17.03	51.32
15	14.56	3.48	0.50	0.24	0.29	2.93	3.45	2.65	0.67	7.07	35.84	17.82	53.66
20	15.24	3.72	0.51	0.24	0.30	3.04	3.58	2.78	0.70	7.42	37.52	18.68	56.20
25	15.98	4.00	0.51	0.24	0.31	3.15	3.71	2.92	0.73	7.80	39.35	19.64	58.99
30	16.78	4.32	0.51	0.24	0.31	3.27	3.85	3.08	0.77	8.22	41.35	20.69	62.04
35	17.64	4.69	0.52	0.24	0.32	3.39	3.99	3.25	0.82	8.68	43.55	21.87	65.42
40	18.58	5.14	0.52	0.24	0.33	3.52	4.14	3.45	0.87	9.21	45.99	23.19	69.18
45	19.60	5.68	0.52	0.24	0.33	3.65	4.30	3.67	0.92	9.80	48.72	24.67	73.39
50	20.74	6.35	0.52	0.24	0.34	3.79	4.46	3.92	0.99	10.47	51.82	26.36	78.18

Table VOC Buses 47 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.82	3.03	0.55	0.27	0.27	2.82	3.32	2.39	0.60	6.37	32.43	16.04	48.47
5	13.41	3.21	0.55	0.27	0.28	2.92	3.44	2.49	0.63	6.65	33.84	16.74	50.59
10	14.03	3.41	0.56	0.27	0.29	3.03	3.57	2.60	0.65	6.95	35.36	17.50	52.87
15	14.70	3.64	0.56	0.27	0.29	3.14	3.70	2.73	0.69	7.28	37.01	18.34	55.35
20	15.42	3.90	0.56	0.27	0.30	3.26	3.84	2.87	0.72	7.64	38.79	19.25	58.05
25	16.19	4.21	0.57	0.27	0.31	3.39	3.99	3.02	0.76	8.05	40.74	20.27	61.01
30	17.03	4.56	0.57	0.27	0.31	3.51	4.14	3.18	0.80	8.49	42.87	21.40	64.27
35	17.94	4.99	0.57	0.27	0.32	3.64	4.29	3.37	0.85	8.99	45.23	22.65	67.89
40	18.93	5.49	0.57	0.27	0.33	3.78	4.45	3.58	0.90	9.56	47.87	24.07	71.94
45	20.02	6.12	0.58	0.27	0.33	3.92	4.62	3.82	0.96	10.19	50.83	25.68	76.51
50	21.22	6.90	0.58	0.27	0.34	4.07	4.80	4.09	1.03	10.92	54.23	27.51	81.74

Table VOC Buses 48 Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.91	3.15	0.61	0.29	0.27	3.03	3.57	2.45	0.62	6.54	33.42	16.46	49.89
5	13.52	3.34	0.61	0.29	0.28	3.14	3.70	2.56	0.64	6.83	34.91	17.20	52.11
10	14.17	3.56	0.61	0.29	0.29	3.26	3.84	2.68	0.67	7.15	36.52	18.00	54.53
15	14.87	3.81	0.61	0.29	0.29	3.38	3.98	2.81	0.71	7.50	38.26	18.89	57.15
20	15.62	4.10	0.62	0.30	0.30	3.51	4.13	2.96	0.74	7.89	40.16	19.86	60.02
25	16.43	4.44	0.62	0.30	0.31	3.64	4.29	3.12	0.78	8.31	42.24	20.94	63.18
30	17.31	4.84	0.62	0.30	0.31	3.78	4.45	3.30	0.83	8.79	44.52	22.15	66.67
35	18.26	5.32	0.63	0.30	0.32	3.92	4.62	3.50	0.88	9.33	47.07	23.50	70.56
40	19.31	5.90	0.63	0.30	0.33	4.06	4.79	3.72	0.94	9.94	49.92	25.03	74.94
45	20.47	6.63	0.63	0.30	0.33	4.22	4.97	3.98	1.00	10.63	53.16	26.77	79.92
50	21.76	7.56	0.63	0.30	0.34	4.38	5.15	4.28	1.08	11.42	56.90	28.77	85.67

Table VOC Buses 49 Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.68	2.46	0.25	0.13	0.29	1.82	2.14	2.06	0.52	5.49	27.84	13.83	41.68
5	13.14	2.57	0.25	0.13	0.30	1.89	2.22	2.14	0.54	5.70	28.88	14.36	43.24
10	13.63	2.70	0.26	0.13	0.31	1.96	2.31	2.22	0.56	5.93	30.00	14.93	44.92
15	14.15	2.84	0.26	0.13	0.31	2.03	2.39	2.31	0.58	6.17	31.19	15.54	46.73
20	14.71	3.00	0.26	0.13	0.32	2.11	2.48	2.41	0.61	6.44	32.47	16.21	48.68
25	15.30	3.18	0.27	0.13	0.33	2.19	2.58	2.52	0.63	6.72	33.85	16.94	50.78
30	15.94	3.38	0.27	0.13	0.33	2.27	2.67	2.64	0.66	7.04	35.34	17.73	53.07
35	16.62	3.60	0.27	0.13	0.34	2.36	2.77	2.77	0.70	7.39	36.95	18.61	55.56
40	17.36	3.86	0.27	0.13	0.35	2.44	2.88	2.91	0.73	7.77	38.72	19.57	58.29
45	18.16	4.16	0.28	0.13	0.35	2.54	2.99	3.07	0.77	8.20	40.64	20.64	61.29
50	19.02	4.51	0.28	0.13	0.36	2.63	3.10	3.25	0.82	8.67	42.77	21.84	64.61

Table VOC Buses 50 Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.71	2.53	0.30	0.15	0.29	1.96	2.30	2.10	0.53	5.59	28.46	14.08	42.54
5	13.18	2.66	0.30	0.15	0.30	2.03	2.39	2.18	0.55	5.81	29.54	14.62	44.17
10	13.68	2.80	0.30	0.16	0.31	2.11	2.48	2.26	0.57	6.04	30.71	15.21	45.92
15	14.22	2.95	0.30	0.16	0.31	2.18	2.57	2.36	0.59	6.29	31.95	15.85	47.80
20	14.80	3.12	0.31	0.16	0.32	2.27	2.67	2.46	0.62	6.57	33.29	16.55	49.84
25	15.41	3.31	0.31	0.16	0.33	2.35	2.77	2.58	0.65	6.87	34.73	17.31	52.04
30	16.07	3.53	0.31	0.16	0.33	2.44	2.87	2.70	0.68	7.20	36.30	18.14	54.44
35	16.78	3.78	0.32	0.16	0.34	2.53	2.98	2.84	0.71	7.57	38.00	19.05	57.05
40	17.55	4.06	0.32	0.16	0.35	2.63	3.09	2.99	0.75	7.97	39.86	20.07	59.92
45	18.37	4.39	0.32	0.16	0.35	2.73	3.21	3.15	0.79	8.41	41.90	21.19	63.09
50	19.28	4.78	0.32	0.16	0.36	2.83	3.33	3.34	0.84	8.92	44.15	22.46	66.61

Table VOC Buses 51 Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.74	2.62	0.34	0.18	0.29	2.10	2.48	2.13	0.54	5.69	29.11	14.33	43.45
5	13.23	2.75	0.34	0.18	0.30	2.18	2.57	2.22	0.56	5.92	30.25	14.90	45.15
10	13.75	2.90	0.34	0.18	0.31	2.26	2.67	2.31	0.58	6.16	31.46	15.51	46.97
15	14.30	3.06	0.35	0.18	0.31	2.35	2.77	2.41	0.61	6.42	32.76	16.18	48.94
20	14.90	3.25	0.35	0.18	0.32	2.44	2.87	2.52	0.63	6.71	34.16	16.90	51.07
25	15.53	3.46	0.35	0.18	0.33	2.53	2.98	2.63	0.66	7.02	35.68	17.69	53.37
30	16.22	3.69	0.36	0.18	0.33	2.62	3.09	2.76	0.69	7.37	37.32	18.56	55.89
35	16.95	3.96	0.36	0.19	0.34	2.72	3.21	2.91	0.73	7.75	39.11	19.52	58.64
40	17.74	4.28	0.36	0.19	0.35	2.82	3.33	3.06	0.77	8.17	41.08	20.59	61.67
45	18.61	4.65	0.36	0.19	0.35	2.93	3.45	3.24	0.81	8.65	43.24	21.78	65.02
50	19.55	5.08	0.37	0.19	0.36	3.04	3.58	3.44	0.86	9.18	45.65	23.11	68.76

Table VOC Buses 52 Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.78	2.71	0.38	0.21	0.29	2.26	2.66	2.17	0.55	5.80	29.81	14.60	44.41
5	13.28	2.85	0.38	0.21	0.30	2.35	2.76	2.26	0.57	6.03	30.99	15.19	46.18
10	13.82	3.01	0.39	0.21	0.31	2.43	2.87	2.35	0.59	6.28	32.26	15.82	48.08
15	14.39	3.19	0.39	0.21	0.31	2.52	2.97	2.46	0.62	6.56	33.63	16.51	50.14
20	15.01	3.39	0.39	0.21	0.32	2.62	3.09	2.57	0.65	6.86	35.10	17.27	52.37
25	15.66	3.61	0.40	0.21	0.33	2.72	3.20	2.69	0.68	7.19	36.69	18.10	54.79
30	16.37	3.87	0.40	0.21	0.33	2.82	3.32	2.83	0.71	7.55	38.42	19.01	57.43
35	17.13	4.17	0.40	0.21	0.34	2.93	3.45	2.98	0.75	7.95	40.31	20.02	60.33
40	17.96	4.52	0.40	0.21	0.35	3.04	3.58	3.15	0.79	8.39	42.39	21.14	63.53
45	18.86	4.93	0.41	0.21	0.35	3.15	3.71	3.33	0.84	8.89	44.69	22.39	67.08
50	19.84	5.43	0.41	0.21	0.36	3.27	3.85	3.54	0.89	9.45	47.26	23.81	71.06

Table VOC Buses 53 Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost		-	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	12.83	2.80	0.43	0.24	0.29	2.43	2.86	2.21	0.56	5.90	30.55	14.87	45.43
5	13.35	2.95	0.43	0.24	0.30	2.52	2.97	2.30	0.58	6.15	31.79	15.48	47.27
10	13.90	3.13	0.43	0.24	0.31	2.62	3.08	2.40	0.60	6.41	33.12	16.14	49.26
15	14.49	3.32	0.43	0.24	0.31	2.71	3.20	2.51	0.63	6.70	34.55	16.87	51.41
20	15.13	3.54	0.44	0.24	0.32	2.82	3.32	2.63	0.66	7.01	36.09	17.66	53.74
25	15.81	3.78	0.44	0.24	0.33	2.92	3.44	2.76	0.69	7.35	37.76	18.52	56.29
30	16.54	4.07	0.44	0.24	0.33	3.03	3.57	2.90	0.73	7.73	39.59	19.48	59.07
35	17.33	4.40	0.45	0.24	0.34	3.15	3.71	3.06	0.77	8.15	41.59	20.54	62.13
40	18.19	4.79	0.45	0.24	0.35	3.26	3.84	3.23	0.81	8.62	43.79	21.72	65.51
45	19.12	5.26	0.45	0.24	0.35	3.39	3.99	3.43	0.86	9.15	46.25	23.05	69.29
50	20.15	5.83	0.45	0.24	0.36	3.51	4.14	3.65	0.92	9.74	49.00	24.54	73.55

Table VOC Buses 54 Financial Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.76	2.46	0.25	0.13	0.29	1.82	2.14	1.57	0.40	4.20	28.02	10.58	38.60
5	15.17	2.57	0.25	0.13	0.30	1.89	2.22	1.60	0.40	4.26	28.80	10.74	39.53
10	15.58	2.70	0.26	0.13	0.31	1.96	2.31	1.62	0.41	4.33	29.60	10.90	40.50
15	16.00	2.84	0.26	0.13	0.31	2.03	2.39	1.65	0.41	4.39	30.43	11.06	41.50
20	16.43	3.00	0.26	0.13	0.32	2.11	2.48	1.67	0.42	4.46	31.29	11.24	42.53
25	16.86	3.18	0.27	0.13	0.33	2.19	2.58	1.70	0.43	4.53	32.19	11.41	43.60
30	17.30	3.38	0.27	0.13	0.33	2.27	2.67	1.73	0.43	4.60	33.12	11.60	44.72
35	17.75	3.60	0.27	0.13	0.34	2.36	2.77	1.75	0.44	4.68	34.10	11.78	45.88
40	18.20	3.86	0.27	0.13	0.35	2.44	2.88	1.78	0.45	4.76	35.12	11.98	47.10
45	18.66	4.16	0.28	0.13	0.35	2.54	2.99	1.81	0.46	4.84	36.21	12.18	48.39
50	19.12	4.51	0.28	0.13	0.36	2.63	3.10	1.84	0.46	4.92	37.36	12.39	49.74

Table VOC Buses 55 Financial Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.53	2.53	0.30	0.15	0.29	1.96	2.30	1.62	0.41	4.32	28.41	10.87	39.28
5	14.95	2.66	0.30	0.15	0.30	2.03	2.39	1.64	0.41	4.38	29.22	11.04	40.26
10	15.38	2.80	0.30	0.16	0.31	2.11	2.48	1.67	0.42	4.45	30.06	11.21	41.27
15	15.81	2.95	0.30	0.16	0.31	2.18	2.57	1.69	0.43	4.52	30.93	11.39	42.32
20	16.25	3.12	0.31	0.16	0.32	2.27	2.67	1.72	0.43	4.59	31.83	11.57	43.40
25	16.69	3.31	0.31	0.16	0.33	2.35	2.77	1.75	0.44	4.67	32.77	11.76	44.53
30	17.14	3.53	0.31	0.16	0.33	2.44	2.87	1.78	0.45	4.74	33.76	11.95	45.71
35	17.60	3.78	0.32	0.16	0.34	2.53	2.98	1.81	0.45	4.82	34.79	12.15	46.94
40	18.06	4.06	0.32	0.16	0.35	2.63	3.09	1.84	0.46	4.91	35.87	12.36	48.23
45	18.53	4.39	0.32	0.16	0.35	2.73	3.21	1.87	0.47	4.99	37.02	12.57	49.59
50	19.00	4.78	0.32	0.16	0.36	2.83	3.33	1.90	0.48	5.08	38.25	12.79	51.04

Table VOC Buses 56 Financial Cost of Operation of Buses on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.32	2.62	0.34	0.18	0.29	2.10	2.48	1.66	0.42	4.44	28.85	11.18	40.04
5	14.75	2.75	0.34	0.18	0.30	2.18	2.57	1.69	0.42	4.51	29.70	11.36	41.06
10	15.19	2.90	0.34	0.18	0.31	2.26	2.67	1.72	0.43	4.58	30.58	11.54	42.12
15	15.63	3.06	0.35	0.18	0.31	2.35	2.77	1.75	0.44	4.66	31.49	11.73	43.22
20	16.08	3.25	0.35	0.18	0.32	2.44	2.87	1.77	0.45	4.73	32.44	11.92	44.36
25	16.54	3.46	0.35	0.18	0.33	2.53	2.98	1.80	0.45	4.81	33.43	12.12	45.55
30	17.00	3.69	0.36	0.18	0.33	2.62	3.09	1.83	0.46	4.89	34.47	12.33	46.79
35	17.47	3.96	0.36	0.19	0.34	2.72	3.21	1.87	0.47	4.98	35.56	12.54	48.09
40	17.94	4.28	0.36	0.19	0.35	2.82	3.33	1.90	0.48	5.07	36.71	12.76	49.47
45	18.42	4.65	0.36	0.19	0.35	2.93	3.45	1.93	0.49	5.16	37.93	12.99	50.92
50	18.91	5.08	0.37	0.19	0.36	3.04	3.58	1.97	0.49	5.25	39.25	13.22	52.47

Table VOC Buses 57 Financial Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	15.12	2.27	0.22	0.13	0.34	1.66	1.96	1.53	0.38	4.08	27.70	10.28	37.98
5	15.52	2.37	0.23	0.13	0.35	1.72	2.03	1.55	0.39	4.14	28.43	10.43	38.86
10	15.93	2.48	0.23	0.13	0.36	1.79	2.11	1.57	0.40	4.20	29.18	10.58	39.76
15	16.34	2.60	0.23	0.13	0.36	1.85	2.18	1.60	0.40	4.26	29.96	10.74	40.70
20	16.75	2.73	0.23	0.13	0.37	1.92	2.27	1.62	0.41	4.33	30.77	10.90	41.66
25	17.17	2.88	0.24	0.13	0.38	2.00	2.35	1.65	0.41	4.39	31.60	11.06	42.66
30	17.60	3.04	0.24	0.13	0.38	2.07	2.44	1.67	0.42	4.46	32.46	11.23	43.70
35	18.03	3.22	0.24	0.13	0.39	2.15	2.53	1.70	0.43	4.53	33.36	11.41	44.77
40	18.47	3.43	0.25	0.13	0.40	2.23	2.63	1.73	0.43	4.60	34.29	11.59	45.89
45	18.92	3.66	0.25	0.13	0.40	2.31	2.73	1.75	0.44	4.68	35.27	11.78	47.06
50	19.37	3.93	0.25	0.13	0.41	2.40	2.83	1.78	0.45	4.76	36.30	11.98	48.28

Table VOC Buses 58 Financial Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.87	2.34	0.25	0.15	0.34	1.78	2.10	1.57	0.39	4.19	28.01	10.56	38.56
5	15.28	2.45	0.25	0.15	0.35	1.85	2.18	1.59	0.40	4.25	28.77	10.71	39.48
10	15.70	2.56	0.26	0.16	0.36	1.92	2.26	1.62	0.41	4.32	29.56	10.87	40.43
15	16.12	2.69	0.26	0.16	0.36	1.99	2.35	1.64	0.41	4.38	30.37	11.04	41.41
20	16.55	2.83	0.26	0.16	0.37	2.07	2.44	1.67	0.42	4.45	31.21	11.21	42.42
25	16.98	2.99	0.27	0.16	0.38	2.15	2.53	1.69	0.43	4.52	32.08	11.38	43.46
30	17.42	3.16	0.2	0.16	0.38	2.23	2.62	1.72	0.43	4.59	32.98	11.57	44.55
35	17.86	3.36	0.2	0.16	0.39	2.31	2.72	1.75	0.44	4.67	33.93	11.75	45.68
40	18.31	3.58	0.2	0.16	0.40	2.40	2.82	1.78	0.45	4.74	34.91	11.95	46.86
45	18.77	3.84	0.20	0.16	0.40	2.49	2.93	1.81	0.45	4.82	35.95	12.15	48.09
50	19.23	4.13	0.28	0.16	0.41	2.58	3.04	1.84	0.46	4.91	37.04	12.35	49.39

Table VOC Buses 59 Financial Cost of Operation of Buses on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost			Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.65	2.41	0.28	0.18	0.34	1.92	2.26	1.61	0.41	4.31	28.37	10.85	39.22
5	15.06	2.52	0.28	0.18	0.35	1.99	2.35	1.64	0.41	4.37	29.16	11.01	40.18
10	15.49	2.65	0.29	0.18	0.36	2.07	2.43	1.66	0.42	4.44	29.98	11.18	41.17
15	15.92	2.78	0.29	0.18	0.36	2.14	2.52	1.69	0.42	4.51	30.83	11.36	42.19
20	16.36	2.93	0.29	0.18	0.37	2.22	2.62	1.72	0.43	4.58	31.71	11.54	43.25
25	16.80	3.10	0.30	0.18	0.38	2.31	2.72	1.74	0.44	4.66	32.63	11.73	44.35
30	17.25	3.29	0.30	0.18	0.38	2.39	2.82	1.77	0.45	4.73	33.58	11.92	45.49
35	17.71	3.51	0.30	0.19	0.39	2.48	2.93	1.80	0.45	4.81	34.57	12.12	46.68
40	18.17	3.75	0.30	0.19	0.40	2.58	3.04	1.83	0.46	4.89	35.61	12.32	47.93
45	18.64	4.03	0.31	0.19	0.40	2.67	3.15	1.87	0.47	4.98	36.70	12.54	49.24
50	19.11	4.36	0.31	0.19	0.41	2.77	3.27	1.90	0.48	5.06	37.86	12.76	50.61

Table VOC Buses 60 Financial Cost of Operation of Buses on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.76	2.46	0.25	0.13	0.29	1.82	2.14	1.57	0.40	4.20	28.02	10.58	38.60
5	15.17	2.57	0.25	0.13	0.30	1.89	2.22	1.60	0.40	4.26	28.80	10.74	39.53
10	15.58	2.70	0.26	0.13	0.31	1.96	2.31	1.62	0.41	4.33	29.60	10.90	40.50
15	16.00	2.84	0.26	0.13	0.31	2.03	2.39	1.65	0.41	4.39	30.43	11.07	41.50
20	16.43	3.00	0.26	0.13	0.32	2.11	2.48	1.67	0.42	4.46	31.29	11.24	42.53
25	16.86	3.18	0.27	0.13	0.33	2.19	2.58	1.70	0.43	4.53	32.19	11.41	43.60
30	17.30	3.38	0.27	0.13	0.33	2.27	2.67	1.73	0.43	4.60	33.12	11.60	44.72
35	17.75	3.60	0.27	0.13	0.34	2.36	2.77	1.75	0.44	4.68	34.10	11.78	45.88
40	18.20	3.86	0.27	0.13	0.35	2.44	2.88	1.78	0.45	4.76	35.12	11.98	47.10
45	18.66	4.16	0.28	0.13	0.35	2.54	2.99	1.81	0.46	4.84	36.21	12.18	48.39
50	19.12	4.51	0.28	0.13	0.36	2.63	3.10	1.84	0.46	4.92	37.36	12.39	49.74

Table VOC Buses 61
Financial Cost of Operation of Buses on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.53	2.53	0.30	0.15	0.29	1.96	2.30	1.62	0.41	4.32	28.41	10.87	39.28
5	14.95	2.66	0.30	0.15	0.30	2.03	2.39	1.64	0.41	4.38	29.22	11.04	40.26
10	15.37	2.80	0.30	0.16	0.31	2.11	2.48	1.67	0.42	4.45	30.06	11.21	41.27
15	15.81	2.95	0.30	0.16	0.31	2.18	2.57	1.69	0.43	4.52	30.93	11.39	42.32
20	16.24	3.12	0.31	0.16	0.32	2.27	2.67	1.72	0.43	4.59	31.83	11.57	43.40
25	16.69	3.31	0.31	0.16	0.33	2.35	2.77	1.75	0.44	4.67	32.77	11.76	44.53
30	17.14	3.53	0.31	0.16	0.33	2.44	2.87	1.78	0.45	4.74	33.76	11.95	45.71
35	17.60	3.78	0.32	0.16	0.34	2.53	2.98	1.81	0.45	4.82	34.79	12.15	46.94
40	18.06	4.06	0.32	0.16	0.35	2.63	3.09	1.84	0.46	4.91	35.87	12.36	48.23
45	18.53	4.39	0.32	0.16	0.35	2.73	3.21	1.87	0.47	4.99	37.02	12.57	49.59
50	19.00	4.78	0.32	0.16	0.36	2.83	3.33	1.90	0.48	5.08	38.25	12.79	51.04

Table VOC Buses 62
Financial Cost of Operation of Buses on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.32	2.62	0.34	0.18	0.29	2.10	2.48	1.66	0.42	4.44	28.85	11.18	40.04
5	14.75	2.75	0.34	0.18	0.30	2.18	2.57	1.69	0.42	4.51	29.70	11.36	41.06
10	15.19	2.90	0.34	0.18	0.31	2.26	2.67	1.72	0.43	4.58	30.58	11.54	42.12
15	15.63	3.06	0.35	0.18	0.31	2.35	2.77	1.75	0.44	4.66	31.49	11.73	43.22
20	16.08	3.25	0.35	0.18	0.32	2.44	2.87	1.77	0.45	4.73	32.44	11.92	44.36
25	16.54	3.46	0.35	0.18	0.33	2.53	2.98	1.80	0.45	4.81	33.43	12.12	45.55
30	17.00	3.69	0.36	0.18	0.33	2.62	3.09	1.83	0.46	4.89	34.47	12.33	46.79
35	17.47	3.96	0.36	0.19	0.34	2.72	3.21	1.87	0.47	4.98	35.56	12.54	48.09
40	17.94	4.28	0.36	0.19	0.35	2.82	3.33	1.90	0.48	5.07	36.71	12.76	49.47
45	18.42	4.65	0.36	0.19	0.35	2.93	3.45	1.93	0.49	5.16	37.93	12.99	50.92
50	18.91	5.08	0.37	0.19	0.36	3.04	3.58	1.97	0.49	5.25	39.25	13.22	52.47

Table VOC Buses 63
Financial Cost of Operation of Buses on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	15.12	2.27	0.22	0.13	0.34	1.66	1.96	1.53	0.38	4.08	27.70	10.28	37.98
5	15.52	2.37	0.23	0.13	0.35	1.72	2.03	1.55	0.39	4.14	28.43	10.43	38.86
10	15.93	2.48	0.23	0.13	0.36	1.79	2.11	1.57	0.40	4.20	29.18	10.58	39.76
15	16.34	2.60	0.23	0.13	0.36	1.85	2.18	1.60	0.40	4.26	29.96	10.74	40.70
20	16.75	2.73	0.23	0.13	0.37	1.92	2.27	1.62	0.41	4.33	30.77	10.90	41.66
25	17.17	2.88	0.24	0.13	0.38	2.00	2.35	1.65	0.41	4.39	31.60	11.06	42.66
30	17.60	3.04	0.24	0.13	0.38	2.07	2.44	1.67	0.42	4.46	32.46	11.24	43.70
35	18.03	3.22	0.24	0.13	0.39	2.15	2.53	1.70	0.43	4.53	33.36	11.41	44.77
40	18.47	3.43	0.25	0.13	0.40	2.23	2.63	1.73	0.43	4.60	34.29	11.59	45.89
45	18.92	3.66	0.25	0.13	0.40	2.31	2.73	1.75	0.44	4.68	35.27	11.78	47.06
50	19.37	3.93	0.25	0.13	0.41	2.40	2.83	1.78	0.45	4.76	36.30	11.98	48.28

Table VOC Buses 64
Financial Cost of Operation of Buses on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.87	2.34	0.25	0.15	0.34	1.78	2.10	1.57	0.39	4.19	28.01	10.56	38.56
5	15.28	2.45	0.25	0.15	0.35	1.85	2.18	1.59	0.40	4.25	28.77	10.71	39.48
10	15.70	2.56	0.26	0.16	0.36	1.92	2.26	1.62	0.41	4.32	29.56	10.87	40.43
15	16.12	2.69	0.26	0.16	0.36	1.99	2.35	1.64	0.41	4.38	30.37	11.04	41.41
20	16.55	2.83	0.26	0.16	0.37	2.07	2.44	1.67	0.42	4.45	31.21	11.21	42.42
25	16.98	2.99	0.27	0.16	0.38	2.15	2.53	1.69	0.43	4.52	32.08	11.39	43.46
30	17.42	3.16	0.27	0.16	0.38	2.23	2.62	1.72	0.43	4.59	32.98	11.57	44.55
35	17.86	3.36	0.27	0.16	0.39	2.31	2.72	1.75	0.44	4.67	33.93	11.75	45.68
40	18.31	3.58	0.27	0.16	0.40	2.40	2.82	1.78	0.45	4.74	34.91	11.95	46.86
45	18.77	3.84	0.28	0.16	0.40	2.49	2.93	1.81	0.45	4.82	35.95	12.15	48.09
50	19.23	4.13	0.28	0.16	0.41	2.58	3.04	1.84	0.46	4.91	37.04	12.36	49.39

Table VOC Buses 65
Financial Cost of Operation of Buses on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.64	2.41	0.28	0.18	0.34	1.92	2.26	1.61	0.41	4.31	28.37	10.85	39.22
5	15.06	2.52	0.28	0.18	0.35	1.99	2.35	1.64	0.41	4.37	29.16	11.01	40.18
10	15.49	2.65	0.29	0.18	0.36	2.07	2.43	1.66	0.42	4.44	29.98	11.18	41.17
15	15.92	2.78	0.29	0.18	0.36	2.14	2.52	1.69	0.42	4.51	30.83	11.36	42.19
20	16.36	2.93	0.29	0.18	0.37	2.22	2.62	1.72	0.43	4.58	31.71	11.54	43.25
25	16.80	3.10	0.30	0.18	0.38	2.31	2.72	1.75	0.44	4.66	32.63	11.73	44.35
30	17.25	3.29	0.30	0.18	0.38	2.39	2.82	1.77	0.45	4.73	33.58	11.92	45.49
35	17.71	3.51	0.30	0.19	0.39	2.48	2.93	1.80	0.45	4.81	34.57	12.12	46.68
40	18.17	3.75	0.30	0.19	0.40	2.58	3.04	1.83	0.46	4.89	35.61	12.32	47.93
45	18.64	4.03	0.31	0.19	0.40	2.67	3.15	1.87	0.47	4.98	36.70	12.54	49.24
50	19.11	4.36	0.31	0.19	0.41	2.77	3.27	1.90	0.48	5.07	37.86	12.76	50.62

Table VOC Buses 66
Financial Cost of Operation of Buses on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	15.51	2.11	0.21	0.13	0.39	1.59	1.87	1.49	0.37	3.97	27.64	9.99	37.63
5	15.90	2.20	0.21	0.13	0.40	1.65	1.94	1.51	0.38	4.02	28.33	10.13	38.47
10	16.29	2.29	0.21	0.13	0.41	1.71	2.01	1.53	0.38	4.08	29.05	10.28	39.33
15	16.69	2.40	0.22	0.13	0.41	1.77	2.09	1.55	0.39	4.14	29.79	10.43	40.21
20	17.10	2.51	0.22	0.13	0.42	1.84	2.17	1.57	0.40	4.20	30.55	10.58	41.12
25	17.51	2.63	0.22	0.13	0.43	1.91	2.25	1.60	0.40	4.26	31.33	10.73	42.07
30	17.92	2.77	0.23	0.13	0.43	1.98	2.33	1.62	0.41	4.33	32.14	10.90	43.04
35	18.34	2.92	0.23	0.13	0.44	2.05	2.42	1.65	0.41	4.39	32.98	11.06	44.04
40	18.77	3.08	0.23	0.13	0.45	2.13	2.51	1.67	0.42	4.46	33.85	11.23	45.09
45	19.20	3.27	0.23	0.13	0.45	2.21	2.60	1.70	0.43	4.53	34.76	11.41	46.17
50	19.64	3.48	0.24	0.13	0.46	2.29	2.70	1.73	0.43	4.60	35.71	11.59	47.30

Table VOC Buses 67
Financial Cost of Operation of Buses on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	15.24	2.17	0.23	0.15	0.39	1.70	2.01	1.53	0.38	4.07	27.89	10.26	38.14
5	15.64	2.26	0.23	0.15	0.40	1.77	2.08	1.55	0.39	4.13	28.61	10.40	39.02
10	16.04	2.36	0.24	0.16	0.41	1.84	2.16	1.57	0.39	4.19	29.36	10.56	39.91
15	16.45	2.47	0.24	0.16	0.41	1.90	2.24	1.59	0.40	4.25	30.13	10.71	40.84
20	16.87	2.59	0.24	0.16	0.42	1.98	2.33	1.62	0.41	4.32	30.92	10.87	41.79
25	17.29	2.72	0.24	0.16	0.43	2.05	2.41	1.64	0.41	4.38	31.74	11.04	42.78
30	17.72	2.87	0.25	0.16	0.43	2.13	2.51	1.67	0.42	4.45	32.59	11.21	43.80
35	18.15	3.03	0.25	0.16	0.44	2.21	2.60	1.69	0.43	4.52	33.47	11.38	44.85
40	18.59	3.21	0.25	0.16	0.45	2.29	2.70	1.72	0.43	4.59	34.38	11.57	45.95
45	19.03	3.41	0.26	0.16	0.45	2.38	2.80	1.75	0.44	4.67	35.34	11.75	47.09
50	19.48	3.64	0.26	0.16	0.46	2.46	2.90	1.78	0.45	4.74	36.33	11.95	48.28

Table VOC Buses 68
Financial Cost of Operation of Buses on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Passe- nger Cost	Grand Cost
0	14.99	2.23	0.25	0.18	0.39	1.83	2.16	1.57	0.39	4.18	28.19	10.53	38.72
5	15.40	2.33	0.25	0.18	0.40	1.90	2.24	1.59	0.40	4.24	28.94	10.69	39.63
10	15.82	2.44	0.26	0.18	0.41	1.97	2.32	1.61	0.41	4.31	29.72	10.85	40.57
15	16.24	2.55	0.26	0.18	0.41	2.05	2.41	1.64	0.41	4.37	30.52	11.01	41.54
20	16.66	2.68	0.26	0.18	0.42	2.12	2.50	1.66	0.42	4.44	31.35	11.18	42.53
25	17.09	2.82	0.27	0.18	0.43	2.20	2.60	1.69	0.42	4.51	32.21	11.36	43.57
30	17.53	2.97	0.27	0.18	0.43	2.29	2.69	1.72	0.43	4.58	33.10	11.54	44.64
35	17.97	3.15	0.27	0.19	0.44	2.37	2.79	1.74	0.44	4.65	34.02	11.72	45.74
40	18.42	3.34	0.27	0.19	0.45	2.46	2.90	1.77	0.45	4.73	34.98	11.92	46.90
45	18.88	3.56	0.28	0.19	0.45	2.55	3.01	1.80	0.45	4.81	35.98	12.12	48.10
50	19.34	3.81	0.28	0.19	0.46	2.65	3.12	1.83	0.46	4.89	37.04	12.32	49.36

Table VOC LCV 1
Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.80	0.94	0.16	0.07	0.01	0.39	0.34	6.85	1.14	8.52	22.21	0.61	22.83
5	4.41	0.99	0.18	0.07	0.01	0.39	0.34	7.10	1.19	8.83	23.50	0.63	24.14
10	5.03	1.05	0.20	0.07	0.01	0.39	0.34	7.37	1.23	9.16	24.86	0.66	25.52
15	5.67	1.12	0.22	0.07	0.01	0.39	0.34	7.66	1.28	9.52	26.28	0.68	26.97
20	6.32	1.20	0.24	0.07	0.02	0.39	0.34	7.97	1.33	9.91	27.79	0.71	28.51
25	6.99	1.29	0.26	0.07	0.02	0.39	0.34	8.31	1.39	10.34	29.39	0.74	30.14
30	7.67	1.39	0.27	0.07	0.02	0.39	0.34	8.69	1.45	10.80	31.10	0.78	31.87
35	8.37	1.51	0.29	0.07	0.02	0.39	0.34	9.09	1.52	11.31	32.92	0.81	33.73
40	9.10	1.66	0.31	0.07	0.03	0.39	0.34	9.54	1.59	11.86	34.89	0.85	35.74
45	9.84	1.83	0.33	0.07	0.03	0.39	0.34	10.03	1.68	12.47	37.02	0.90	37.91
50	10.62	2.05	0.35	0.07	0.03	0.39	0.34	10.58	1.77	13.15	39.34	0.95	40.29

Table VOC LCV 2
Economic Cost of Operation of LCV on Single Lane Roads (Rs/km) Maintenance Cost

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew	Total Cost	Commodity Holding Cost	Grand Cost
0	3.80	0.97	0.17	0.09	0.01	0.45	0.39	6.95	1.16	8.64	22.61	0.62	23.23
5	4.41	1.03	0.19	0.09	0.01	0.45	0.39	7.20	1.20	8.96	23.93	0.64	24.57
10	5.04	1.09	0.21	0.09	0.01	0.45	0.39	7.48	1.25	9.30	25.31	0.67	25.98
15	5.68	1.16	0.23	0.09	0.01	0.45	0.39	7.78	1.30	9.67	26.77	0.70	27.46
20	6.34	1.25	0.24	0.09	0.02	0.45	0.39	8.11	1.35	10.08	28.31	0.72	29.04
25	7.01	1.34	0.26	0.09	0.02	0.45	0.39	8.46	1.41	10.52	29.95	0.76	30.71
30	7.71	1.46	0.28	0.09	0.02	0.45	0.39	8.84	1.48	11.00	31.71	0.79	32.50
35	8.42	1.59	0.30	0.09	0.02	0.45	0.39	9.26	1.55	11.52	33.59	0.83	34.42
40	9.15	1.75	0.32	0.09	0.03	0.45	0.39	9.73	1.63	12.10	35.62	0.87	36.49
45	9.90	1.95	0.34	0.09	0.03	0.45	0.39	10.24	1.71	12.74	37.83	0.92	38.75
50	10.69	2.19	0.35	0.09	0.03	0.45	0.39	10.81	1.81	13.44	40.26	0.97	41.22

Table VOC LCV 3 Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.80	1.00	0.18	0.11	0.01	0.52	0.45	7.05	1.18	8.76	23.03	0.63	23.66
5	4.42	1.06	0.20	0.11	0.01	0.52	0.45	7.31	1.22	9.09	24.38	0.65	25.03
10	5.05	1.13	0.21	0.11	0.01	0.52	0.45	7.60	1.27	9.45	25.79	0.68	26.47
15	5.70	1.21	0.23	0.11	0.01	0.52	0.45	7.91	1.32	9.83	27.28	0.71	27.99
20	6.36	1.30	0.25	0.11	0.02	0.52	0.45	8.24	1.38	10.25	28.87	0.74	29.60
25	7.04	1.40	0.27	0.11	0.02	0.52	0.45	8.61	1.44	10.70	30.55	0.77	31.32
30	7.74	1.53	0.29	0.11	0.02	0.52	0.45	9.01	1.50	11.20	32.36	0.81	33.16
35	8.46	1.68	0.31	0.11	0.02	0.52	0.45	9.44	1.58	11.74	34.30	0.84	35.14
40	9.20	1.85	0.32	0.11	0.03	0.52	0.45	9.93	1.66	12.34	36.40	0.89	37.29
45	9.97	2.08	0.34	0.11	0.03	0.52	0.45	10.46	1.75	13.01	38.70	0.94	39.64
50	10.77	2.36	0.36	0.11	0.03	0.52	0.45	11.06	1.85	13.75	41.24	0.99	42.23

Table VOC LCV 4 Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.80	1.03	0.18	0.12	0.01	0.60	0.51	7.15	1.19	8.89	23.49	0.64	24.13
5	4.43	1.10	0.20	0.12	0.01	0.60	0.51	7.42	1.24	9.23	24.86	0.66	25.52
10	5.07	1.17	0.22	0.12	0.01	0.60	0.51	7.72	1.29	9.59	26.30	0.69	26.99
15	5.72	1.26	0.24	0.12	0.01	0.60	0.51	8.04	1.34	9.99	27.83	0.72	28.55
20	6.39	1.35	0.26	0.12	0.02	0.60	0.51	8.38	1.40	10.42	29.46	0.75	30.21
25	7.08	1.47	0.28	0.12	0.02	0.60	0.51	8.76	1.46	10.89	31.19	0.78	31.98
30	7.78	1.61	0.29	0.12	0.02	0.60	0.51	9.17	1.53	11.41	33.05	0.82	33.87
35	8.51	1.77	0.31	0.12	0.02	0.60	0.51	9.63	1.61	11.97	35.06	0.86	35.92
40	9.26	1.97	0.33	0.12	0.03	0.60	0.51	10.13	1.69	12.60	37.24	0.91	38.15
45	10.04	2.22	0.35	0.12	0.03	0.60	0.51	10.69	1.79	13.29	39.64	0.96	40.60
50	10.85	2.55	0.37	0.12	0.03	0.60	0.51	11.31	1.89	14.06	42.30	1.01	43.31

Table VOC LCV 5 Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.80	1.07	0.19	0.14	0.01	0.69	0.59	7.25	1.21	9.02	23.97	0.65	24.62
5	4.44	1.14	0.21	0.14	0.01	0.69	0.59	7.54	1.26	9.37	25.38	0.67	26.05
10	5.08	1.22	0.23	0.14	0.01	0.69	0.59	7.84	1.31	9.75	26.85	0.70	27.56
15	5.74	1.31	0.25	0.14	0.01	0.69	0.59	8.17	1.36	10.16	28.42	0.73	29.15
20	6.42	1.42	0.26	0.14	0.02	0.69	0.59	8.53	1.42	10.60	30.09	0.76	30.85
25	7.11	1.54	0.28	0.14	0.02	0.69	0.59	8.92	1.49	11.09	31.88	0.80	32.67
30	7.83	1.69	0.30	0.14	0.02	0.69	0.59	9.35	1.56	11.62	33.80	0.84	34.63
35	8.56	1.88	0.32	0.14	0.02	0.69	0.59	9.82	1.64	12.21	35.88	0.88	36.75
40	9.32	2.10	0.34	0.14	0.03	0.69	0.59	10.34	1.73	12.86	38.15	0.92	39.07
45	10.12	2.39	0.36	0.14	0.03	0.69	0.59	10.93	1.82	13.59	40.65	0.98	41.63
50	10.94	2.78	0.37	0.14	0.03	0.69	0.59	11.58	1.93	14.40	43.45	1.04	44.49

Table VOC LCV 6 Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.81	1.10	0.20	0.16	0.01	0.79	0.68	7.36	1.23	9.15	24.50	0.66	25.16
5	4.45	1.18	0.22	0.16	0.01	0.79	0.68	7.65	1.28	9.52	25.93	0.68	26.62
10	5.10	1.27	0.23	0.16	0.01	0.79	0.68	7.97	1.33	9.91	27.45	0.71	28.16
15	5.77	1.37	0.25	0.16	0.01	0.79	0.68	8.31	1.39	10.33	29.06	0.74	29.80
20	6.45	1.48	0.27	0.16	0.02	0.79	0.68	8.68	1.45	10.79	30.77	0.78	31.55
25	7.15	1.62	0.29	0.16	0.02	0.79	0.68	9.08	1.52	11.30	32.61	0.81	33.42
30	7.87	1.79	0.31	0.16	0.02	0.79	0.68	9.53	1.59	11.85	34.60	0.85	35.45
35	8.62	1.99	0.33	0.16	0.02	0.79	0.68	10.02	1.67	12.46	36.75	0.90	37.65
40	9.39	2.25	0.34	0.16	0.03	0.79	0.68	10.57	1.77	13.14	39.12	0.94	40.06
45	10.20	2.59	0.36	0.16	0.03	0.79	0.68	11.17	1.87	13.89	41.75	1.00	42.75
50	11.04	3.05	0.38	0.16	0.03	0.79	0.68	11.86	1.98	14.74	44.71	1.06	45.77

Table VOC LCV 7 Economic Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.82	1.15	0.20	0.18	0.01	0.91	0.78	7.47	1.25	9.29	25.07	0.67	25.73
5	4.46	1.23	0.22	0.18	0.01	0.91	0.78	7.77	1.30	9.67	26.53	0.70	27.23
10	5.12	1.32	0.24	0.18	0.01	0.91	0.78	8.10	1.35	10.07	28.08	0.72	28.81
15	5.79	1.43	0.26	0.18	0.01	0.91	0.78	8.45	1.41	10.51	29.74	0.76	30.49
20	6.48	1.56	0.28	0.18	0.02	0.91	0.78	8.83	1.48	10.99	31.50	0.79	32.29
25	7.19	1.71	0.30	0.18	0.02	0.91	0.78	9.26	1.55	11.51	33.40	0.83	34.23
30	7.92	1.90	0.31	0.18	0.02	0.91	0.78	9.72	1.62	12.08	35.46	0.87	36.33
35	8.68	2.13	0.33	0.18	0.02	0.91	0.78	10.23	1.71	12.72	37.70	0.91	38.61
40	9.46	2.43	0.35	0.18	0.03	0.91	0.78	10.80	1.80	13.43	40.18	0.97	41.14
45	10.28	2.83	0.37	0.18	0.03	0.91	0.78	11.43	1.91	14.22	42.94	1.02	43.97
50	11.15	3.38	0.39	0.18	0.03	0.91	0.78	12.15	2.03	15.11	46.10	1.09	47.19

Table VOC LCV 8 Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.04	0.79	0.16	0.07	0.01	0.29	0.25	6.46	1.08	8.03	21.16	0.58	21.74
5	4.62	0.82	0.18	0.07	0.01	0.29	0.25	6.70	1.12	8.33	22.38	0.60	22.98
10	5.21	0.87	0.20	0.07	0.01	0.29	0.25	6.95	1.16	8.65	23.66	0.62	24.28
15	5.82	0.91	0.22	0.07	0.01	0.29	0.25	7.23	1.21	8.99	25.01	0.65	25.65
20	6.44	0.96	0.23	0.07	0.02	0.29	0.25	7.54	1.26	9.37	26.43	0.67	27.10
25	7.08	1.02	0.25	0.07	0.02	0.29	0.25	7.86	1.31	9.78	27.94	0.70	28.64
30	7.74	1.08	0.27	0.07	0.02	0.29	0.25	8.22	1.37	10.22	29.54	0.74	30.28
35	8.41	1.15	0.29	0.07	0.02	0.29	0.25	8.61	1.44	10.71	31.26	0.77	32.03
40	9.11	1.24	0.31	0.07	0.03	0.29	0.25	9.05	1.51	11.25	33.10	0.81	33.91
45	9.83	1.33	0.33	0.07	0.03	0.29	0.25	9.52	1.59	11.84	35.09	0.85	35.94
50	10.58	1.44	0.34	0.07	0.03	0.29	0.25	10.06	1.68	12.50	37.25	0.90	38.14

Table VOC LCV 9 Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.02	0.81	0.16	0.09	0.01	0.34	0.29	6.55	1.09	8.14	21.50	0.59	22.09
5	4.61	0.85	0.18	0.09	0.01	0.34	0.29	6.80	1.14	8.45	22.74	0.61	23.35
10	5.21	0.89	0.20	0.09	0.01	0.34	0.29	7.06	1.18	8.78	24.05	0.63	24.68
15	5.82	0.94	0.22	0.09	0.01	0.34	0.29	7.35	1.23	9.14	25.42	0.66	26.08
20	6.45	0.99	0.24	0.09	0.02	0.34	0.29	7.66	1.28	9.53	26.88	0.69	27.57
25	7.10	1.05	0.26	0.09	0.02	0.34	0.29	8.00	1.34	9.95	28.43	0.72	29.14
30	7.76	1.12	0.27	0.09	0.02	0.34	0.29	8.37	1.40	10.41	30.07	0.75	30.82
35	8.44	1.20	0.29	0.09	0.02	0.34	0.29	8.78	1.47	10.92	31.84	0.79	32.62
40	9.15	1.29	0.31	0.09	0.03	0.34	0.29	9.23	1.54	11.48	33.74	0.83	34.56
45	9.88	1.39	0.33	0.09	0.03	0.34	0.29	9.73	1.62	12.10	35.79	0.87	36.66
50	10.64	1.51	0.35	0.09	0.03	0.34	0.29	10.28	1.72	12.79	38.03	0.92	38.95

Table VOC LCV 10 Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.01	0.83	0.17	0.11	0.01	0.39	0.33	6.65	1.11	8.26	21.86	0.59	22.45
5	4.60	0.87	0.19	0.11	0.01	0.39	0.33	6.90	1.15	8.58	23.12	0.62	23.74
10	5.21	0.92	0.21	0.11	0.01	0.39	0.33	7.17	1.20	8.92	24.46	0.64	25.10
15	5.83	0.97	0.22	0.11	0.01	0.39	0.33	7.47	1.25	9.29	25.87	0.67	26.53
20	6.46	1.03	0.24	0.11	0.02	0.39	0.33	7.79	1.30	9.69	27.36	0.70	28.05
25	7.12	1.09	0.26	0.11	0.02	0.39	0.33	8.15	1.36	10.13	28.94	0.73	29.67
30	7.79	1.16	0.28	0.11	0.02	0.39	0.33	8.53	1.42	10.61	30.64	0.76	31.40
35	8.48	1.25	0.30	0.11	0.02	0.39	0.33	8.95	1.50	11.13	32.46	0.80	33.26
40	9.19	1.34	0.32	0.11	0.03	0.39	0.33	9.42	1.57	11.72	34.42	0.84	35.26
45	9.94	1.46	0.33	0.11	0.03	0.39	0.33	9.94	1.66	12.36	36.54	0.89	37.43
50	10.71	1.59	0.35	0.11	0.03	0.39	0.33	10.52	1.76	13.08	38.87	0.94	39.81

Table VOC LCV 11
Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.00	0.85	0.17	0.12	0.01	0.44	0.38	6.74	1.13	8.39	22.24	0.60	22.84
5	4.60	0.90	0.19	0.12	0.01	0.44	0.38	7.01	1.17	8.71	23.53	0.63	24.16
10	5.21	0.94	0.21	0.12	0.01	0.44	0.38	7.29	1.22	9.06	24.90	0.65	25.55
15	5.84	1.00	0.23	0.12	0.01	0.44	0.38	7.60	1.27	9.45	26.34	0.68	27.02
20	6.48	1.06	0.25	0.12	0.02	0.44	0.38	7.93	1.32	9.86	27.87	0.71	28.57
25	7.14	1.13	0.27	0.12	0.02	0.44	0.38	8.29	1.39	10.31	29.49	0.74	30.24
30	7.82	1.21	0.28	0.12	0.02	0.44	0.38	8.69	1.45	10.81	31.24	0.78	32.01
35	8.52	1.30	0.30	0.12	0.02	0.44	0.38	9.13	1.53	11.36	33.11	0.82	33.93
40	9.24	1.40	0.32	0.12	0.03	0.44	0.38	9.62	1.61	11.96	35.14	0.86	36.00
45	10.00	1.53	0.34	0.12	0.03	0.44	0.38	10.16	1.70	12.64	37.34	0.91	38.25
50	10.78	1.67	0.36	0.12	0.03	0.44	0.38	10.77	1.80	13.39	39.76	0.96	40.72

Table VOC LCV 12 Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.99	0.88	0.18	0.14	0.01	0.51	0.44	6.85	1.14	8.51	22.65	0.61	23.26
5	4.60	0.92	0.20	0.14	0.01	0.51	0.44	7.12	1.19	8.85	23.97	0.64	24.60
10	5.21	0.97	0.21	0.14	0.01	0.51	0.44	7.41	1.24	9.21	25.36	0.66	26.02
15	5.85	1.03	0.23	0.14	0.01	0.51	0.44	7.72	1.29	9.61	26.84	0.69	27.53
20	6.50	1.10	0.25	0.14	0.02	0.51	0.44	8.07	1.35	10.04	28.41	0.72	29.13
25	7.16	1.17	0.27	0.14	0.02	0.51	0.44	8.45	1.41	10.51	30.08	0.76	30.84
30	7.85	1.26	0.29	0.14	0.02	0.51	0.44	8.86	1.48	11.02	31.87	0.79	32.67
35	8.56	1.35	0.31	0.14	0.02	0.51	0.44	9.32	1.56	11.59	33.81	0.83	34.64
40	9.30	1.47	0.32	0.14	0.03	0.51	0.44	9.83	1.64	12.22	35.90	0.88	36.78
45	10.06	1.60	0.34	0.14	0.03	0.51	0.44	10.40	1.74	12.93	38.19	0.93	39.12
50	10.86	1.77	0.36	0.14	0.03	0.51	0.44	11.03	1.84	13.72	40.71	0.99	41.69

Table VOC LCV 13
Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		_	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.99	0.90	0.18	0.16	0.01	0.59	0.51	6.95	1.16	8.64	23.09	0.62	23.71
5	4.60	0.95	0.20	0.16	0.01	0.59	0.51	7.23	1.21	8.99	24.44	0.65	25.08
10	5.22	1.00	0.22	0.16	0.01	0.59	0.51	7.53	1.26	9.36	25.86	0.67	26.54
15	5.86	1.07	0.24	0.16	0.01	0.59	0.51	7.86	1.31	9.77	27.38	0.70	28.08
20	6.52	1.14	0.26	0.16	0.02	0.59	0.51	8.22	1.37	10.22	28.99	0.73	29.72
25	7.19	1.22	0.27	0.16	0.02	0.59	0.51	8.61	1.44	10.70	30.71	0.77	31.48
30	7.89	1.31	0.29	0.16	0.02	0.59	0.51	9.04	1.51	11.24	32.56	0.81	33.36
35	8.61	1.42	0.31	0.16	0.02	0.59	0.51	9.52	1.59	11.83	34.55	0.85	35.40
40	9.35	1.54	0.33	0.16	0.03	0.59	0.51	10.05	1.68	12.49	36.72	0.90	37.62
45	10.13	1.69	0.35	0.16	0.03	0.59	0.51	10.64	1.78	13.23	39.10	0.95	40.05
50	10.95	1.87	0.37	0.16	0.03	0.59	0.51	11.31	1.89	14.06	41.73	1.01	42.74

Table VOC LCV 14 Economic Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	3.99	0.93	0.19	0.18	0.01	0.68	0.58	7.06	1.18	8.78	23.56	0.63	24.19
5	4.60	0.98	0.21	0.18	0.01	0.68	0.58	7.35	1.23	9.13	24.94	0.66	25.60
10	5.23	1.04	0.22	0.18	0.01	0.68	0.58	7.66	1.28	9.52	26.40	0.68	27.08
15	5.88	1.10	0.24	0.18	0.01	0.68	0.58	8.00	1.34	9.94	27.95	0.71	28.67
20	6.54	1.18	0.26	0.18	0.02	0.68	0.58	8.37	1.40	10.40	29.60	0.75	30.35
25	7.22	1.27	0.28	0.18	0.02	0.68	0.58	8.77	1.47	10.91	31.38	0.78	32.16
30	7.93	1.37	0.30	0.18	0.02	0.68	0.58	9.22	1.54	11.47	33.28	0.82	34.11
35	8.66	1.48	0.32	0.18	0.02	0.68	0.58	9.72	1.62	12.09	35.35	0.87	36.22
40	9.42	1.62	0.33	0.18	0.03	0.68	0.58	10.27	1.72	12.77	37.60	0.92	38.52
45	10.21	1.79	0.35	0.18	0.03	0.68	0.58	10.89	1.82	13.55	40.08	0.97	41.05
50	11.04	1.99	0.37	0.18	0.03	0.68	0.58	11.59	1.94	14.42	42.83	1.04	43.86

Table VOC LCV 15 Economic Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.30	0.69	0.16	0.07	0.01	0.25	0.22	6.12	1.02	7.61	20.44	0.60	21.05
5	4.85	0.72	0.18	0.07	0.01	0.25	0.22	6.35	1.06	7.89	21.60	0.63	22.22
10	5.41	0.75	0.20	0.07	0.01	0.25	0.22	6.60	1.10	8.20	22.81	0.65	23.46
15	5.99	0.79	0.21	0.07	0.01	0.25	0.22	6.86	1.15	8.53	24.09	0.68	24.77
20	6.59	0.82	0.23	0.07	0.02	0.25	0.22	7.15	1.20	8.90	25.45	0.71	26.15
25	7.20	0.86	0.25	0.07	0.02	0.25	0.22	7.47	1.25	9.29	26.88	0.74	27.62
30	7.83	0.91	0.27	0.07	0.02	0.25	0.22	7.82	1.31	9.72	28.41	0.77	29.18
35	8.48	0.96	0.29	0.07	0.02	0.25	0.22	8.20	1.37	10.19	30.05	0.81	30.86
40	9.15	1.02	0.31	0.07	0.03	0.25	0.22	8.62	1.44	10.71	31.81	0.85	32.66
45	9.84	1.08	0.32	0.07	0.03	0.25	0.22	9.08	1.52	11.29	33.70	0.90	34.60
50	10.56	1.15	0.34	0.07	0.03	0.25	0.22	9.60	1.60	11.93	35.76	0.95	36.71

Table VOC LCV 16 Economic Cost of Operation of LCV on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.27	0.71	0.16	0.09	0.01	0.29	0.25	6.21	1.04	7.72	20.74	0.61	21.35
5	4.83	0.74	0.18	0.09	0.01	0.29	0.25	6.44	1.08	8.01	21.92	0.64	22.55
10	5.40	0.77	0.20	0.09	0.01	0.29	0.25	6.70	1.12	8.33	23.16	0.66	23.82
15	5.98	0.81	0.22	0.09	0.01	0.29	0.25	6.98	1.17	8.68	24.47	0.69	25.16
20	6.58	0.85	0.24	0.09	0.02	0.29	0.25	7.28	1.22	9.05	25.86	0.72	26.57
25	7.20	0.89	0.25	0.09	0.02	0.29	0.25	7.61	1.27	9.46	27.33	0.75	28.08
30	7.84	0.94	0.27	0.09	0.02	0.29	0.25	7.97	1.33	9.90	28.90	0.79	29.69
35	8.50	0.99	0.29	0.09	0.02	0.29	0.25	8.36	1.40	10.39	30.58	0.82	31.41
40	9.18	1.05	0.31	0.09	0.03	0.29	0.25	8.80	1.47	10.94	32.40	0.87	33.26
45	9.88	1.12	0.33	0.09	0.03	0.29	0.25	9.28	1.55	11.54	34.36	0.91	35.27
50	10.62	1.19	0.35	0.09	0.03	0.29	0.25	9.82	1.64	12.21	36.49	0.97	37.46

Table VOC LCV 17 Economic Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	_	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.25	0.72	0.17	0.11	0.01	0.34	0.29	6.30	1.05	7.83	21.06	0.62	21.68
5	4.81	0.75	0.18	0.11	0.01	0.34	0.29	6.54	1.09	8.14	22.26	0.65	22.91
10	5.38	0.79	0.20	0.11	0.01	0.34	0.29	6.81	1.14	8.47	23.53	0.67	24.20
15	5.98	0.83	0.22	0.11	0.01	0.34	0.29	7.09	1.18	8.82	24.87	0.70	25.57
20	6.58	0.87	0.24	0.11	0.02	0.34	0.29	7.41	1.24	9.21	26.29	0.73	27.02
25	7.21	0.91	0.26	0.11	0.02	0.34	0.29	7.75	1.29	9.63	27.80	0.76	28.57
30	7.86	0.97	0.28	0.11	0.02	0.34	0.29	8.12	1.36	10.09	29.42	0.80	30.22
35	8.52	1.02	0.29	0.11	0.02	0.34	0.29	8.53	1.42	10.60	31.15	0.84	31.99
40	9.21	1.09	0.31	0.11	0.03	0.34	0.29	8.98	1.50	11.17	33.02	0.89	33.91
45	9.93	1.16	0.33	0.11	0.03	0.34	0.29	9.49	1.58	11.80	35.05	0.94	35.98
50	10.68	1.24	0.35	0.11	0.03	0.34	0.29	10.05	1.68	12.50	37.26	0.99	38.25

Table VOC LCV 18 Economic Cost of Operation of LCV on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.23	0.74	0.17	0.12	0.01	0.39	0.33	6.39	1.07	7.95	21.40	0.63	22.03
5	4.79	0.77	0.19	0.12	0.01	0.39	0.33	6.65	1.11	8.26	22.63	0.66	23.28
10	5.38	0.81	0.21	0.12	0.01	0.39	0.33	6.92	1.16	8.60	23.92	0.68	24.61
15	5.97	0.85	0.22	0.12	0.01	0.39	0.33	7.21	1.21	8.97	25.30	0.71	26.01
20	6.59	0.89	0.24	0.12	0.02	0.39	0.33	7.54	1.26	9.37	26.75	0.74	27.50
25	7.22	0.94	0.26	0.12	0.02	0.39	0.33	7.89	1.32	9.81	28.31	0.78	29.08
30	7.88	1.00	0.28	0.12	0.02	0.39	0.33	8.28	1.38	10.29	29.97	0.82	30.78
35	8.55	1.06	0.30	0.12	0.02	0.39	0.33	8.70	1.45	10.82	31.75	0.86	32.61
40	9.25	1.13	0.32	0.12	0.03	0.39	0.33	9.18	1.53	11.41	33.68	0.90	34.59
45	9.98	1.20	0.33	0.12	0.03	0.39	0.33	9.70	1.62	12.07	35.78	0.96	36.74
50	10.74	1.29	0.35	0.12	0.03	0.39	0.33	10.30	1.72	12.80	38.08	1.01	39.10

Table VOC LCV 19 Economic Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.21	0.76	0.17	0.14	0.01	0.45	0.38	6.49	1.08	8.07	21.77	0.64	22.41
5	4.78	0.79	0.19	0.14	0.01	0.45	0.38	6.75	1.13	8.40	23.02	0.67	23.69
10	5.37	0.83	0.21	0.14	0.01	0.45	0.38	7.03	1.17	8.75	24.35	0.69	25.04
15	5.97	0.87	0.23	0.14	0.01	0.45	0.38	7.34	1.23	9.13	25.75	0.72	26.48
20	6.60	0.92	0.25	0.14	0.02	0.45	0.38	7.67	1.28	9.54	27.25	0.76	28.00
25	7.24	0.97	0.26	0.14	0.02	0.45	0.38	8.04	1.34	10.00	28.84	0.79	29.63
30	7.90	1.03	0.28	0.14	0.02	0.45	0.38	8.44	1.41	10.50	30.55	0.83	31.38
35	8.58	1.09	0.30	0.14	0.02	0.45	0.38	8.89	1.48	11.05	32.39	0.88	33.27
40	9.29	1.17	0.32	0.14	0.03	0.45	0.38	9.38	1.57	11.66	34.39	0.92	35.31
45	10.03	1.25	0.34	0.14	0.03	0.45	0.38	9.93	1.66	12.35	36.56	0.98	37.54
50	10.81	1.35	0.36	0.14	0.03	0.45	0.38	10.55	1.76	13.12	38.96	1.04	40.00

Table VOC LCV 20 Economic Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.27	0.69	0.16	0.07	0.01	0.25	0.22	5.27	0.88	6.56	19.39	1.09	20.47
5	5.93	0.72	0.18	0.07	0.01	0.25	0.22	5.33	0.89	6.62	20.22	1.10	21.32
10	6.59	0.75	0.20	0.07	0.01	0.25	0.22	5.38	0.90	6.69	21.06	1.11	22.17
15	7.24	0.79	0.21	0.07	0.01	0.25	0.22	5.44	0.91	6.76	21.90	1.12	23.02
20	7.90	0.82	0.23	0.07	0.02	0.25	0.22	5.49	0.92	6.83	22.76	1.13	23.89
25	8.56	0.86	0.25	0.07	0.02	0.25	0.22	5.55	0.93	6.90	23.62	1.14	24.76
30	9.22	0.91	0.27	0.07	0.02	0.25	0.22	5.61	0.94	6.97	24.49	1.16	25.64
35	9.89	0.96	0.29	0.07	0.02	0.25	0.22	5.67	0.95	7.05	25.37	1.17	26.53
40	10.55	1.02	0.31	0.07	0.03	0.25	0.22	5.73	0.96	7.13	26.26	1.18	27.44
45	11.22	1.08	0.32	0.07	0.03	0.25	0.22	5.79	0.97	7.20	27.16	1.19	28.35
50	11.88	1.15	0.34	0.07	0.03	0.25	0.22	5.86	0.98	7.28	28.07	1.21	29.28

Table VOC LCV 21 Economic Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.03	0.71	0.16	0.09	0.01	0.29	0.25	5.48	0.92	6.82	19.75	1.13	20.88
5	5.69	0.74	0.18	0.09	0.01	0.29	0.25	5.54	0.93	6.89	20.60	1.14	21.74
10	6.35	0.77	0.20	0.09	0.01	0.29	0.25	5.60	0.93	6.96	21.46	1.15	22.61
15	7.01	0.81	0.22	0.09	0.01	0.29	0.25	5.66	0.94	7.03	22.32	1.17	23.49
20	7.68	0.85	0.24	0.09	0.02	0.29	0.25	5.72	0.96	7.11	23.19	1.18	24.37
25	8.34	0.89	0.25	0.09	0.02	0.29	0.25	5.78	0.97	7.19	24.07	1.19	25.26
30	9.01	0.94	0.27	0.09	0.02	0.29	0.25	5.84	0.98	7.27	24.96	1.20	26.16
35	9.68	0.99	0.29	0.09	0.02	0.29	0.25	5.91	0.99	7.35	25.86	1.22	27.08
40	10.35	1.05	0.31	0.09	0.03	0.29	0.25	5.98	1.00	7.43	26.77	1.23	28.00
45	11.02	1.12	0.33	0.09	0.03	0.29	0.25	6.04	1.01	7.52	27.69	1.25	28.94
50	11.69	1.19	0.35	0.09	0.03	0.29	0.25	6.11	1.02	7.60	28.63	1.26	29.89

Table VOC LCV 22 Economic Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.80	0.72	0.17	0.11	0.01	0.34	0.29	5.71	0.95	7.10	20.19	1.18	21.36
5	5.47	0.75	0.18	0.11	0.01	0.34	0.29	5.77	0.96	7.17	21.05	1.19	22.24
10	6.14	0.79	0.20	0.11	0.01	0.34	0.29	5.83	0.97	7.25	21.93	1.20	23.13
15	6.80	0.83	0.22	0.11	0.01	0.34	0.29	5.90	0.98	7.33	22.81	1.21	24.03
20	7.47	0.87	0.24	0.11	0.02	0.34	0.29	5.96	1.00	7.41	23.70	1.23	24.93
25	8.14	0.91	0.26	0.11	0.02	0.34	0.29	6.03	1.01	7.50	24.60	1.24	25.85
30	8.82	0.97	0.28	0.11	0.02	0.34	0.29	6.10	1.02	7.59	25.52	1.26	26.77
35	9.49	1.02	0.29	0.11	0.02	0.34	0.29	6.17	1.03	7.67	26.44	1.27	27.71
40	10.16	1.09	0.31	0.11	0.03	0.34	0.29	6.24	1.04	7.76	27.37	1.29	28.66
45	10.84	1.16	0.33	0.11	0.03	0.34	0.29	6.32	1.06	7.86	28.32	1.30	29.62
50	11.52	1.24	0.35	0.11	0.03	0.34	0.29	6.39	1.07	7.95	29.29	1.32	30.60

Table VOC LCV 23 Economic Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.49	0.54	0.16	0.07	0.01	0.22	0.18	5.14	0.86	6.39	19.05	1.06	20.11
5	6.14	0.56	0.17	0.07	0.01	0.22	0.18	5.19	0.87	6.45	19.86	1.07	20.93
10	6.79	0.57	0.19	0.07	0.01	0.22	0.18	5.24	0.88	6.52	20.68	1.08	21.76
15	7.45	0.59	0.21	0.07	0.01	0.22	0.18	5.29	0.88	6.58	21.50	1.09	22.59
20	8.10	0.61	0.23	0.07	0.02	0.22	0.18	5.35	0.89	6.65	22.32	1.10	23.43
25	8.76	0.64	0.25	0.07	0.02	0.22	0.18	5.40	0.90	6.72	23.16	1.11	24.27
30	9.42	0.66	0.27	0.07	0.02	0.22	0.18	5.46	0.91	6.79	23.99	1.12	25.12
35	10.08	0.69	0.28	0.07	0.02	0.22	0.18	5.51	0.92	6.86	24.84	1.14	25.97
40	10.74	0.72	0.30	0.07	0.03	0.22	0.18	5.57	0.93	6.93	25.69	1.15	26.83
45	11.40	0.75	0.32	0.07	0.03	0.22	0.18	5.63	0.94	7.00	26.54	1.16	27.70
50	12.06	0.78	0.34	0.07	0.03	0.22	0.18	5.69	0.95	7.08	27.41	1.17	28.58

Table VOC LCV 24 Economic Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.23	0.55	0.16	0.09	0.01	0.25	0.21	5.34	0.89	6.64	19.36	1.10	20.46
5	5.89	0.57	0.18	0.09	0.01	0.25	0.21	5.39	0.90	6.70	20.18	1.11	21.29
10	6.55	0.58	0.20	0.09	0.01	0.25	0.21	5.45	0.91	6.77	21.01	1.12	22.14
15	7.20	0.61	0.21	0.09	0.01	0.25	0.21	5.50	0.92	6.84	21.85	1.13	22.99
20	7.87	0.63	0.23	0.09	0.02	0.25	0.21	5.56	0.93	6.91	22.69	1.15	23.84
25	8.53	0.65	0.25	0.09	0.02	0.25	0.21	5.62	0.94	6.99	23.54	1.16	24.70
30	9.19	0.68	0.27	0.09	0.02	0.25	0.21	5.68	0.95	7.06	24.40	1.17	25.57
35	9.85	0.70	0.29	0.09	0.02	0.25	0.21	5.74	0.96	7.14	25.26	1.18	26.44
40	10.52	0.73	0.31	0.09	0.03	0.25	0.21	5.80	0.97	7.22	26.13	1.20	27.32
45	11.19	0.77	0.32	0.09	0.03	0.25	0.21	5.87	0.98	7.30	27.00	1.21	28.21
50	11.86	0.80	0.34	0.09	0.03	0.25	0.21	5.93	0.99	7.38	27.89	1.22	29.11

Table VOC LCV 25 Economic Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.99	0.56	0.16	0.11	0.01	0.29	0.24	5.55	0.93	6.90	19.73	1.14	20.87
5	5.65	0.58	0.18	0.11	0.01	0.29	0.24	5.61	0.94	6.97	20.57	1.16	21.73
10	6.32	0.60	0.20	0.11	0.01	0.29	0.24	5.67	0.95	7.05	21.42	1.17	22.59
15	6.98	0.62	0.22	0.11	0.01	0.29	0.24	5.73	0.96	7.12	22.28	1.18	23.46
20	7.65	0.64	0.23	0.11	0.02	0.29	0.24	5.79	0.97	7.20	23.14	1.19	24.33
25	8.31	0.66	0.25	0.11	0.02	0.29	0.24	5.86	0.98	7.28	24.00	1.21	25.21
30	8.98	0.69	0.27	0.11	0.02	0.29	0.24	5.92	0.99	7.36	24.88	1.22	26.10
35	9.65	0.72	0.29	0.11	0.02	0.29	0.24	5.99	1.00	7.45	25.76	1.23	26.99
40	10.32	0.75	0.31	0.11	0.03	0.29	0.24	6.06	1.01	7.53	26.64	1.25	27.89
45	11.00	0.79	0.33	0.11	0.03	0.29	0.24	6.13	1.02	7.62	27.54	1.26	28.80
50	11.67	0.82	0.34	0.11	0.03	0.29	0.24	6.20	1.04	7.71	28.45	1.28	29.72

Table VOC LCV 26 Economic Cost of Operation of LCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.27	0.69	0.16	0.07	0.01	0.25	0.22	5.27	0.88	6.56	19.39	1.09	20.47
5	5.93	0.72	0.18	0.07	0.01	0.25	0.22	5.33	0.89	6.62	20.22	1.10	21.32
10	6.59	0.75	0.20	0.07	0.01	0.25	0.22	5.38	0.90	6.69	21.06	1.11	22.17
15	7.24	0.79	0.21	0.07	0.01	0.25	0.22	5.44	0.91	6.76	21.90	1.12	23.02
20	7.90	0.82	0.23	0.07	0.02	0.25	0.22	5.49	0.92	6.83	22.76	1.13	23.89
25	8.56	0.86	0.25	0.07	0.02	0.25	0.22	5.55	0.93	6.90	23.62	1.14	24.76
30	9.22	0.91	0.27	0.07	0.02	0.25	0.22	5.61	0.94	6.97	24.49	1.16	25.64
35	9.89	0.96	0.29	0.07	0.02	0.25	0.22	5.67	0.95	7.05	25.37	1.17	26.53
40	10.55	1.02	0.31	0.07	0.03	0.25	0.22	5.73	0.96	7.13	26.26	1.18	27.44
45	11.22	1.08	0.32	0.07	0.03	0.25	0.22	5.79	0.97	7.20	27.16	1.19	28.35
50	11.88	1.15	0.34	0.07	0.03	0.25	0.22	5.86	0.98	7.28	28.07	1.21	29.28

Table VOC LCV 27 Economic Cost of Operation of LCV on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.03	0.71	0.16	0.09	0.01	0.29	0.25	5.48	0.92	6.82	19.75	1.13	20.88
5	5.69	0.74	0.18	0.09	0.01	0.29	0.25	5.54	0.93	6.89	20.60	1.14	21.74
10	6.35	0.77	0.20	0.09	0.01	0.29	0.25	5.60	0.93	6.96	21.46	1.15	22.61
15	7.01	0.81	0.22	0.09	0.01	0.29	0.25	5.66	0.94	7.03	22.32	1.17	23.49
20	7.68	0.85	0.24	0.09	0.02	0.29	0.25	5.72	0.96	7.11	23.19	1.18	24.37
25	8.34	0.89	0.25	0.09	0.02	0.29	0.25	5.78	0.97	7.19	24.07	1.19	25.26
30	9.01	0.94	0.27	0.09	0.02	0.29	0.25	5.84	0.98	7.27	24.96	1.20	26.16
35	9.68	0.99	0.29	0.09	0.02	0.29	0.25	5.91	0.99	7.35	25.86	1.22	27.08
40	10.35	1.05	0.31	0.09	0.03	0.29	0.25	5.98	1.00	7.43	26.77	1.23	28.00
45	11.02	1.12	0.33	0.09	0.03	0.29	0.25	6.04	1.01	7.52	27.69	1.25	28.94
50	11.69	1.19	0.35	0.09	0.03	0.29	0.25	6.11	1.02	7.60	28.63	1.26	29.89

Table VOC LCV 28 Economic Cost of Operation of LCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.80	0.72	0.17	0.11	0.01	0.34	0.29	5.71	0.95	7.10	20.19	1.18	21.36
5	5.47	0.75	0.18	0.11	0.01	0.34	0.29	5.77	0.96	7.17	21.05	1.19	22.24
10	6.14	0.79	0.20	0.11	0.01	0.34	0.29	5.83	0.97	7.25	21.93	1.20	23.13
15	6.80	0.83	0.22	0.11	0.01	0.34	0.29	5.90	0.98	7.33	22.81	1.21	24.03
20	7.47	0.87	0.24	0.11	0.02	0.34	0.29	5.96	1.00	7.41	23.70	1.23	24.93
25	8.14	0.91	0.26	0.11	0.02	0.34	0.29	6.03	1.01	7.50	24.60	1.24	25.85
30	8.82	0.97	0.28	0.11	0.02	0.34	0.29	6.10	1.02	7.59	25.52	1.26	26.77
35	9.49	1.02	0.29	0.11	0.02	0.34	0.29	6.17	1.03	7.67	26.44	1.27	27.71
40	10.16	1.09	0.31	0.11	0.03	0.34	0.29	6.24	1.04	7.76	27.37	1.29	28.66
45	10.84	1.16	0.33	0.11	0.03	0.34	0.29	6.32	1.06	7.86	28.32	1.30	29.62
50	11.52	1.24	0.35	0.11	0.03	0.34	0.29	6.39	1.07	7.95	29.29	1.32	30.60

Table VOC LCV 29 Economic Cost of Operation of LCV on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.49	0.54	0.16	0.07	0.01	0.22	0.18	5.14	0.86	6.39	19.05	1.06	20.11
5	6.14	0.56	0.17	0.07	0.01	0.22	0.18	5.19	0.87	6.45	19.86	1.07	20.93
10	6.79	0.57	0.19	0.07	0.01	0.22	0.18	5.24	0.88	6.52	20.68	1.08	21.76
15	7.45	0.59	0.21	0.07	0.01	0.22	0.18	5.29	0.88	6.58	21.50	1.09	22.59
20	8.10	0.61	0.23	0.07	0.02	0.22	0.18	5.35	0.89	6.65	22.32	1.10	23.43
25	8.76	0.64	0.25	0.07	0.02	0.22	0.18	5.40	0.90	6.72	23.16	1.11	24.27
30	9.42	0.66	0.27	0.07	0.02	0.22	0.18	5.46	0.91	6.79	23.99	1.12	25.12
35	10.08	0.69	0.28	0.07	0.02	0.22	0.18	5.51	0.92	6.86	24.84	1.14	25.97
40	10.74	0.72	0.30	0.07	0.03	0.22	0.18	5.57	0.93	6.93	25.69	1.15	26.83
45	11.40	0.75	0.32	0.07	0.03	0.22	0.18	5.63	0.94	7.00	26.54	1.16	27.70
50	12.06	0.78	0.34	0.07	0.03	0.22	0.18	5.69	0.95	7.08	27.41	1.17	28.58

Table VOC LCV 30 Economic Cost of Operation of LCV on Six Lane Divided Expressways (Rs/km)

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RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.23	0.55	0.16	0.09	0.01	0.25	0.21	5.34	0.89	6.64	19.36	1.10	20.46
5	5.89	0.57	0.18	0.09	0.01	0.25	0.21	5.39	0.90	6.70	20.18	1.11	21.29
10	6.55	0.58	0.20	0.09	0.01	0.25	0.21	5.45	0.91	6.77	21.01	1.12	22.14
15	7.20	0.61	0.21	0.09	0.01	0.25	0.21	5.50	0.92	6.84	21.85	1.13	22.99
20	7.86	0.63	0.23	0.09	0.02	0.25	0.21	5.56	0.93	6.91	22.69	1.15	23.84
25	8.53	0.65	0.25	0.09	0.02	0.25	0.21	5.62	0.94	6.99	23.54	1.16	24.70
30	9.19	0.68	0.27	0.09	0.02	0.25	0.21	5.68	0.95	7.06	24.40	1.17	25.57
35	9.85	0.70	0.29	0.09	0.02	0.25	0.21	5.74	0.96	7.14	25.26	1.18	26.44
40	10.52	0.73	0.31	0.09	0.03	0.25	0.21	5.80	0.97	7.22	26.13	1.20	27.32
45	11.19	0.77	0.32	0.09	0.03	0.25	0.21	5.87	0.98	7.30	27.00	1.21	28.21
50	11.86	0.80	0.34	0.09	0.03	0.25	0.21	5.93	0.99	7.38	27.89	1.22	29.11

Table VOC LCV 31
Economic Cost of Operation of LCV on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	4.99	0.56	0.16	0.11	0.01	0.29	0.24	5.55	0.93	6.90	19.73	1.14	20.87
5	5.65	0.58	0.18	0.11	0.01	0.29	0.24	5.61	0.94	6.97	20.57	1.16	21.73
10	6.32	0.60	0.20	0.11	0.01	0.29	0.24	5.67	0.95	7.05	21.42	1.17	22.59
15	6.98	0.62	0.22	0.11	0.01	0.29	0.24	5.73	0.96	7.12	22.28	1.18	23.46
20	7.65	0.64	0.23	0.11	0.02	0.29	0.24	5.79	0.97	7.20	23.14	1.19	24.33
25	8.31	0.66	0.25	0.11	0.02	0.29	0.24	5.86	0.98	7.28	24.00	1.21	25.21
30	8.98	0.69	0.27	0.11	0.02	0.29	0.24	5.92	0.99	7.36	24.88	1.22	26.10
35	9.65	0.72	0.29	0.11	0.02	0.29	0.24	5.99	1.00	7.45	25.76	1.23	26.99
40	10.32	0.75	0.31	0.11	0.03	0.29	0.24	6.06	1.01	7.53	26.64	1.25	27.89
45	10.99	0.79	0.33	0.11	0.03	0.29	0.24	6.13	1.02	7.62	27.54	1.26	28.80
50	11.67	0.82	0.34	0.11	0.03	0.29	0.24	6.20	1.04	7.71	28.45	1.28	29.72

Table VOC LCV 32
Economic Cost of Operation of LCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.71	0.44	0.16	0.07	0.01	0.20	0.17	5.01	0.84	6.23	18.83	1.03	19.86
5	6.36	0.45	0.17	0.07	0.01	0.20	0.17	5.06	0.85	6.29	19.63	1.04	20.67
10	7.01	0.46	0.19	0.07	0.01	0.20	0.17	5.11	0.85	6.35	20.43	1.05	21.48
15	7.66	0.48	0.21	0.07	0.01	0.20	0.17	5.16	0.86	6.41	21.23	1.06	22.30
20	8.31	0.49	0.23	0.07	0.02	0.20	0.17	5.21	0.87	6.48	22.04	1.07	23.12
25	8.96	0.51	0.25	0.07	0.02	0.20	0.17	5.26	0.88	6.54	22.86	1.08	23.94
30	9.62	0.52	0.27	0.07	0.02	0.20	0.17	5.31	0.89	6.61	23.67	1.09	24.77
35	10.28	0.54	0.28	0.07	0.02	0.20	0.17	5.37	0.90	6.67	24.50	1.11	25.60
40	10.93	0.55	0.30	0.07	0.03	0.20	0.17	5.42	0.91	6.74	25.33	1.12	26.44
45	11.59	0.57	0.32	0.07	0.03	0.20	0.17	5.48	0.92	6.81	26.16	1.13	27.29
50	12.25	0.59	0.34	0.07	0.03	0.20	0.17	5.54	0.92	6.88	27.00	1.14	28.14

Table VOC LCV 33
Economic Cost of Operation of LCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.44	0.45	0.16	0.09	0.01	0.23	0.20	5.20	0.87	6.47	19.10	1.07	20.17
5	6.09	0.46	0.18	0.09	0.01	0.23	0.20	5.25	0.88	6.53	19.91	1.08	20.99
10	6.75	0.47	0.19	0.09	0.01	0.23	0.20	5.30	0.89	6.59	20.72	1.09	21.81
15	7.40	0.48	0.21	0.09	0.01	0.23	0.20	5.36	0.89	6.66	21.54	1.10	22.64
20	8.06	0.50	0.23	0.09	0.02	0.23	0.20	5.41	0.90	6.73	22.36	1.11	23.48
25	8.72	0.51	0.25	0.09	0.02	0.23	0.20	5.47	0.91	6.80	23.19	1.13	24.32
30	9.38	0.53	0.27	0.09	0.02	0.23	0.20	5.52	0.92	6.87	24.03	1.14	25.16
35	10.04	0.55	0.29	0.09	0.02	0.23	0.20	5.58	0.93	6.94	24.86	1.15	26.01
40	10.70	0.56	0.30	0.09	0.03	0.23	0.20	5.64	0.94	7.02	25.71	1.16	26.87
45	11.37	0.58	0.32	0.09	0.03	0.23	0.20	5.70	0.95	7.09	26.56	1.17	27.73
50	12.03	0.60	0.34	0.09	0.03	0.23	0.20	5.77	0.96	7.17	27.41	1.19	28.60

Table VOC LCV 34
Economic Cost of Operation of LCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.19	0.45	0.16	0.11	0.01	0.26	0.23	5.40	0.90	6.72	19.42	1.11	20.53
5	5.85	0.47	0.18	0.11	0.01	0.26	0.23	5.46	0.91	6.79	20.25	1.12	21.37
10	6.51	0.48	0.20	0.11	0.01	0.26	0.23	5.51	0.92	6.86	21.08	1.14	22.21
15	7.17	0.49	0.21	0.11	0.01	0.26	0.23	5.57	0.93	6.93	21.91	1.15	23.06
20	7.83	0.51	0.23	0.11	0.02	0.26	0.23	5.63	0.94	7.00	22.75	1.16	23.91
25	8.49	0.52	0.25	0.11	0.02	0.26	0.23	5.69	0.95	7.08	23.60	1.17	24.77
30	9.16	0.54	0.27	0.11	0.02	0.26	0.23	5.75	0.96	7.15	24.45	1.19	25.63
35	9.82	0.56	0.29	0.11	0.02	0.26	0.23	5.82	0.97	7.23	25.30	1.20	26.50
40	10.49	0.57	0.31	0.11	0.03	0.26	0.23	5.88	0.98	7.31	26.17	1.21	27.38
45	11.16	0.59	0.32	0.11	0.03	0.26	0.23	5.95	0.99	7.39	27.03	1.23	28.26
50	11.83	0.61	0.34	0.11	0.03	0.26	0.23	6.01	1.00	7.48	27.91	1.24	29.15

Table VOC LCV 35 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.03	1.54	0.34	0.14	0.01	0.70	0.60	7.85	1.64	8.52	30.38	0.61	30.99
5	10.49	1.63	0.37	0.14	0.02	0.70	0.60	8.14	1.70	8.83	32.62	0.63	33.26
10	11.97	1.73	0.41	0.14	0.03	0.70	0.60	8.45	1.77	9.16	34.96	0.66	35.62
15	13.49	1.84	0.45	0.14	0.03	0.70	0.60	8.78	1.84	9.52	37.39	0.68	38.08
20	15.04	1.97	0.49	0.14	0.04	0.70	0.60	9.14	1.91	9.91	39.94	0.71	40.66
25	16.63	2.12	0.52	0.14	0.04	0.70	0.60	9.53	1.99	10.34	42.62	0.74	43.36
30	18.26	2.29	0.56	0.14	0.05	0.70	0.60	9.96	2.08	10.80	45.43	0.78	46.21
35	19.93	2.49	0.60	0.14	0.05	0.70	0.60	10.42	2.18	11.31	48.42	0.81	49.23
40	21.65	2.72	0.64	0.14	0.06	0.70	0.60	10.93	2.29	11.86	51.59	0.85	52.44
45	23.42	3.01	0.67	0.14	0.06	0.70	0.60	11.50	2.40	12.47	54.99	0.90	55.89
50	25.26	3.37	0.71	0.14	0.07	0.70	0.60	12.12	2.54	13.15	58.67	0.95	59.62

Table VOC LCV 36 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.03	1.59	0.35	0.18	0.01	0.81	0.69	7.96	1.67	8.64	30.93	0.62	31.55
5	10.50	1.68	0.39	0.18	0.02	0.81	0.69	8.26	1.73	8.96	33.21	0.64	33.85
10	12.00	1.79	0.42	0.18	0.03	0.81	0.69	8.57	1.79	9.30	35.58	0.67	36.25
15	13.53	1.91	0.46	0.18	0.03	0.81	0.69	8.92	1.87	9.67	38.06	0.70	38.76
20	15.09	2.05	0.50	0.18	0.04	0.81	0.69	9.29	1.94	10.08	40.66	0.72	41.39
25	16.69	2.21	0.54	0.18	0.04	0.81	0.69	9.69	2.03	10.52	43.39	0.76	44.15
30	18.34	2.39	0.57	0.18	0.05	0.81	0.69	10.14	2.12	11.00	46.28	0.79	47.07
35	20.03	2.61	0.61	0.18	0.05	0.81	0.69	10.62	2.22	11.52	49.34	0.83	50.17
40	21.77	2.88	0.65	0.18	0.06	0.81	0.69	11.15	2.33	12.10	52.61	0.87	53.48
45	23.57	3.20	0.69	0.18	0.06	0.81	0.69	11.74	2.46	12.74	56.12	0.92	57.04
50	25.44	3.60	0.72	0.18	0.07	0.81	0.69	12.39	2.59	13.44	59.94	0.97	60.91

Table VOC LCV 37 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.03	1.64	0.36	0.21	0.01	0.93	0.80	8.07	1.69	8.76	31.52	0.63	32.15
5	10.51	1.74	0.40	0.21	0.02	0.93	0.80	8.38	1.75	9.09	33.84	0.65	34.49
10	12.02	1.85	0.44	0.21	0.03	0.93	0.80	8.71	1.82	9.45	36.26	0.68	36.93
15	13.57	1.98	0.48	0.21	0.03	0.93	0.80	9.06	1.90	9.83	38.78	0.71	39.49
20	15.15	2.13	0.51	0.21	0.04	0.93	0.80	9.45	1.98	10.25	41.44	0.74	42.17
25	16.76	2.31	0.55	0.21	0.04	0.93	0.80	9.86	2.06	10.70	44.23	0.77	45.00
30	18.43	2.51	0.59	0.21	0.05	0.93	0.80	10.32	2.16	11.20	47.19	0.81	47.99
35	20.13	2.75	0.63	0.21	0.05	0.93	0.80	10.82	2.26	11.74	50.33	0.84	51.18
40	21.90	3.05	0.66	0.21	0.06	0.93	0.80	11.38	2.38	12.34	53.70	0.89	54.59
45	23.72	3.41	0.70	0.21	0.06	0.93	0.80	11.99	2.51	13.01	57.34	0.94	58.28
50	25.63	3.87	0.74	0.21	0.07	0.93	0.80	12.67	2.65	13.75	61.31	0.99	62.30

Table VOC LCV 38 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.04	1.69	0.38	0.25	0.01	1.07	0.92	8.19	1.71	8.89	32.16	0.64	32.80
5	10.53	1.80	0.41	0.25	0.02	1.07	0.92	8.51	1.78	9.23	34.52	0.66	35.18
10	12.06	1.92	0.45	0.25	0.03	1.07	0.92	8.84	1.85	9.59	36.98	0.69	37.67
15	13.61	2.06	0.49	0.25	0.03	1.07	0.92	9.21	1.93	9.99	39.56	0.72	40.28
20	15.21	2.22	0.53	0.25	0.04	1.07	0.92	9.61	2.01	10.42	42.27	0.75	43.02
25	16.84	2.41	0.56	0.25	0.04	1.07	0.92	10.04	2.10	10.89	45.13	0.78	45.91
30	18.52	2.64	0.60	0.25	0.05	1.07	0.92	10.51	2.20	11.41	48.17	0.82	48.99
35	20.25	2.91	0.64	0.25	0.05	1.07	0.92	11.04	2.31	11.97	51.40	0.86	52.26
40	22.04	3.24	0.68	0.25	0.06	1.07	0.92	11.61	2.43	12.60	54.88	0.91	55.79
45	23.89	3.65	0.71	0.25	0.06	1.07	0.92	12.25	2.56	13.29	58.66	0.96	59.62
50	25.83	4.19	0.75	0.25	0.07	1.07	0.92	12.96	2.71	14.06	62.81	1.01	63.82

Table VOC LCV 39 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.05	1.75	0.39	0.28	0.01	1.23	1.06	8.31	1.74	9.02	32.86	0.65	33.51
5	10.56	1.87	0.43	0.28	0.02	1.23	1.06	8.64	1.81	9.37	35.26	0.67	35.93
10	12.09	2.00	0.46	0.28	0.03	1.23	1.06	8.98	1.88	9.75	37.77	0.70	38.47
15	13.67	2.15	0.50	0.28	0.03	1.23	1.06	9.36	1.96	10.16	40.40	0.73	41.13
20	15.28	2.32	0.54	0.28	0.04	1.23	1.06	9.77	2.04	10.60	43.17	0.76	43.93
25	16.93	2.53	0.58	0.28	0.04	1.23	1.06	10.22	2.14	11.09	46.10	0.80	46.90
30	18.63	2.78	0.61	0.28	0.05	1.23	1.06	10.71	2.24	11.62	49.22	0.84	50.06
35	20.38	3.08	0.65	0.28	0.05	1.23	1.06	11.26	2.35	12.21	52.56	0.88	53.44
40	22.19	3.45	0.69	0.28	0.06	1.23	1.06	11.86	2.48	12.86	56.16	0.92	57.09
45	24.07	3.93	0.73	0.28	0.06	1.23	1.06	12.52	2.62	13.59	60.10	0.98	61.07
50	26.04	4.56	0.76	0.28	0.07	1.23	1.06	13.27	2.78	14.40	64.45	1.04	65.49

Table VOC LCV 40 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.07	1.81	0.40	0.32	0.01	1.42	1.22	8.44	1.76	9.15	33.62	0.66	34.28
5	10.59	1.94	0.44	0.32	0.02	1.42	1.22	8.77	1.83	9.52	36.06	0.68	36.75
10	12.14	2.08	0.48	0.32	0.03	1.42	1.22	9.13	1.91	9.91	38.62	0.71	39.34
15	13.72	2.24	0.52	0.32	0.03	1.42	1.22	9.52	1.99	10.33	41.31	0.74	42.05
20	15.35	2.43	0.55	0.32	0.04	1.42	1.22	9.95	2.08	10.79	44.15	0.78	44.92
25	17.02	2.66	0.59	0.32	0.04	1.42	1.22	10.41	2.18	11.30	47.16	0.81	47.97
30	18.74	2.94	0.63	0.32	0.05	1.42	1.22	10.92	2.28	11.85	50.36	0.85	51.22
35	20.51	3.28	0.67	0.32	0.05	1.42	1.22	11.49	2.40	12.46	53.81	0.90	54.71
40	22.35	3.70	0.70	0.32	0.06	1.42	1.22	12.11	2.53	13.14	57.55	0.94	58.50
45	24.27	4.26	0.74	0.32	0.06	1.42	1.22	12.81	2.68	13.89	61.67	1.00	62.66
50	26.28	5.00	0.78	0.32	0.07	1.42	1.22	13.59	2.84	14.74	66.26	1.06	67.32

Table VOC LCV 41 Financial Cost of Operation of LCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	9	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.09	1.88	0.42	0.36	0.01	1.63	1.40	8.57	1.79	9.29	34.45	0.67	35.12
5	10.62	2.01	0.45	0.36	0.02	1.63	1.40	8.91	1.86	9.67	36.94	0.70	37.64
10	12.19	2.17	0.49	0.36	0.03	1.63	1.40	9.28	1.94	10.07	39.55	0.72	40.28
15	13.79	2.35	0.53	0.36	0.03	1.63	1.40	9.68	2.03	10.51	42.30	0.76	43.06
20	15.43	2.56	0.57	0.36	0.04	1.63	1.40	10.13	2.12	10.99	45.21	0.79	46.00
25	17.12	2.81	0.60	0.36	0.04	1.63	1.40	10.61	2.22	11.51	48.30	0.83	49.13
30	18.86	3.12	0.64	0.36	0.05	1.63	1.40	11.14	2.33	12.08	51.61	0.87	52.48
35	20.66	3.50	0.68	0.36	0.05	1.63	1.40	11.73	2.45	12.72	55.18	0.91	56.09
40	22.53	3.99	0.72	0.36	0.06	1.63	1.40	12.38	2.59	13.43	59.08	0.97	60.04
45	24.48	4.64	0.75	0.36	0.06	1.63	1.40	13.11	2.74	14.22	63.39	1.02	64.41
50	26.53	5.54	0.79	0.36	0.07	1.63	1.40	13.93	2.91	15.11	68.27	1.09	69.36

Table VOC LCV 42 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.60	1.29	0.33	0.14	0.01	0.52	0.45	7.40	1.55	8.03	29.32	0.58	29.90
5	10.98	1.35	0.37	0.14	0.02	0.52	0.45	7.67	1.61	8.33	31.44	0.60	32.04
10	12.40	1.42	0.40	0.14	0.03	0.52	0.45	7.97	1.67	8.65	33.64	0.62	34.27
15	13.85	1.50	0.44	0.14	0.03	0.52	0.45	8.29	1.73	8.99	35.94	0.65	36.59
20	15.33	1.58	0.48	0.14	0.04	0.52	0.45	8.64	1.81	9.37	38.35	0.67	39.02
25	16.85	1.67	0.52	0.14	0.04	0.52	0.45	9.01	1.89	9.78	40.87	0.70	41.57
30	18.41	1.78	0.55	0.14	0.05	0.52	0.45	9.42	1.97	10.22	43.52	0.74	44.26
35	20.02	1.90	0.59	0.14	0.05	0.52	0.45	9.87	2.07	10.71	46.32	0.77	47.09
40	21.68	2.03	0.63	0.14	0.06	0.52	0.45	10.37	2.17	11.25	49.29	0.81	50.10
45	23.39	2.19	0.67	0.14	0.06	0.52	0.45	10.92	2.28	11.84	52.46	0.85	53.31
50	25.17	2.37	0.70	0.14	0.07	0.52	0.45	11.52	2.41	12.50	55.86	0.90	56.76

Table VOC LCV 43 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.57	1.33	0.34	0.18	0.01	0.60	0.52	7.51	1.57	8.14	29.76	0.59	30.35
5	10.97	1.39	0.37	0.18	0.02	0.60	0.52	7.79	1.63	8.45	31.91	0.61	32.52
10	12.39	1.46	0.41	0.18	0.03	0.60	0.52	8.09	1.69	8.78	34.15	0.63	34.79
15	13.85	1.54	0.45	0.18	0.03	0.60	0.52	8.42	1.76	9.14	36.50	0.66	37.15
20	15.35	1.63	0.49	0.18	0.04	0.60	0.52	8.78	1.84	9.53	38.95	0.69	39.63
25	16.89	1.73	0.52	0.18	0.04	0.60	0.52	9.17	1.92	9.95	41.52	0.72	42.23
30	18.47	1.84	0.56	0.18	0.05	0.60	0.52	9.60	2.01	10.41	44.23	0.75	44.98
35	20.10	1.97	0.60	0.18	0.05	0.60	0.52	10.06	2.11	10.92	47.10	0.79	47.88
40	21.78	2.11	0.64	0.18	0.06	0.60	0.52	10.58	2.21	11.48	50.15	0.83	50.97
45	23.51	2.28	0.67	0.18	0.06	0.60	0.52	11.15	2.33	12.10	53.41	0.87	54.28
50	25.32	2.48	0.71	0.18	0.07	0.60	0.52	11.79	2.47	12.79	56.92	0.92	57.84

Table VOC LCV 44 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.54	1.36	0.35	0.21	0.01	0.69	0.59	7.62	1.59	8.26	30.24	0.59	30.83
5	10.95	1.43	0.38	0.21	0.02	0.69	0.59	7.91	1.65	8.58	32.42	0.62	33.04
10	12.39	1.51	0.42	0.21	0.03	0.69	0.59	8.22	1.72	8.92	34.70	0.64	35.35
15	13.87	1.59	0.46	0.21	0.03	0.69	0.59	8.56	1.79	9.29	37.09	0.67	37.76
20	15.38	1.68	0.50	0.21	0.04	0.69	0.59	8.93	1.87	9.69	39.59	0.70	40.28
25	16.94	1.79	0.53	0.21	0.04	0.69	0.59	9.34	1.95	10.13	42.22	0.73	42.94
30	18.53	1.91	0.57	0.21	0.05	0.69	0.59	9.78	2.05	10.61	44.99	0.76	45.75
35	20.18	2.05	0.61	0.21	0.05	0.69	0.59	10.26	2.15	11.13	47.93	0.80	48.73
40	21.88	2.21	0.65	0.21	0.06	0.69	0.59	10.80	2.26	11.72	51.06	0.84	51.90
45	23.65	2.39	0.68	0.21	0.06	0.69	0.59	11.39	2.38	12.36	54.42	0.89	55.31
50	25.48	2.61	0.72	0.21	0.07	0.69	0.59	12.06	2.52	13.08	58.04	0.94	58.98

Table VOC LCV 45
Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.52	1.40	0.36	0.25	0.01	0.80	0.68	7.73	1.62	8.39	30.75	0.60	31.35
5	10.94	1.47	0.39	0.25	0.02	0.80	0.68	8.03	1.68	8.71	32.97	0.63	33.60
10	12.40	1.55	0.43	0.25	0.03	0.80	0.68	8.35	1.75	9.06	35.30	0.65	35.95
15	13.89	1.64	0.47	0.25	0.03	0.80	0.68	8.71	1.82	9.45	37.73	0.68	38.41
20	15.42	1.74	0.51	0.25	0.04	0.80	0.68	9.09	1.90	9.86	40.28	0.71	40.99
25	16.99	1.85	0.54	0.25	0.04	0.80	0.68	9.51	1.99	10.31	42.96	0.74	43.70
30	18.61	1.98	0.58	0.25	0.05	0.80	0.68	9.96	2.08	10.81	45.80	0.78	46.58
35	20.27	2.13	0.62	0.25	0.05	0.80	0.68	10.47	2.19	11.36	48.82	0.82	49.64
40	22.00	2.30	0.66	0.25	0.06	0.80	0.68	11.03	2.31	11.96	52.04	0.86	52.90
45	23.79	2.51	0.69	0.25	0.06	0.80	0.68	11.65	2.44	12.64	55.50	0.91	56.41
50	25.66	2.75	0.73	0.25	0.07	0.80	0.68	12.34	2.58	13.39	59.25	0.96	60.22

Table VOC LCV 46 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.51	1.44	0.36	0.28	0.01	0.92	0.79	7.85	1.64	8.51	31.31	0.61	31.92
5	10.94	1.51	0.40	0.28	0.02	0.92	0.79	8.16	1.71	8.85	33.57	0.64	34.21
10	12.41	1.60	0.44	0.28	0.03	0.92	0.79	8.49	1.78	9.21	35.94	0.66	36.60
15	13.91	1.69	0.48	0.28	0.03	0.92	0.79	8.85	1.85	9.61	38.41	0.69	39.10
20	15.46	1.80	0.51	0.28	0.04	0.92	0.79	9.25	1.93	10.04	41.02	0.72	41.74
25	17.05	1.92	0.55	0.28	0.04	0.92	0.79	9.68	2.03	10.51	43.77	0.76	44.52
30	18.68	2.06	0.59	0.28	0.05	0.92	0.79	10.16	2.12	11.02	46.68	0.79	47.47
35	20.37	2.22	0.63	0.28	0.05	0.92	0.79	10.68	2.23	11.59	49.77	0.83	50.61
40	22.12	2.41	0.66	0.28	0.06	0.92	0.79	11.27	2.36	12.22	53.09	0.88	53.97
45	23.95	2.64	0.70	0.28	0.06	0.92	0.79	11.91	2.49	12.93	56.67	0.93	57.60
50	25.85	2.90	0.74	0.28	0.07	0.92	0.79	12.64	2.64	13.72	60.56	0.99	61.54

Table VOC LCV 47 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.50	1.48	0.37	0.32	0.01	1.06	0.91	7.97	1.67	8.64	31.92	0.62	32.54
5	10.94	1.56	0.41	0.32	0.02	1.06	0.91	8.29	1.73	8.99	34.22	0.65	34.87
10	12.43	1.65	0.45	0.32	0.03	1.06	0.91	8.63	1.81	9.36	36.63	0.67	37.30
15	13.95	1.75	0.49	0.32	0.03	1.06	0.91	9.01	1.88	9.77	39.16	0.70	39.86
20	15.51	1.87	0.52	0.32	0.04	1.06	0.91	9.42	1.97	10.22	41.82	0.73	42.55
25	17.12	2.00	0.56	0.32	0.04	1.06	0.91	9.87	2.06	10.70	44.63	0.77	45.40
30	18.77	2.15	0.60	0.32	0.05	1.06	0.91	10.36	2.17	11.24	47.62	0.81	48.42
35	20.48	2.32	0.64	0.32	0.05	1.06	0.91	10.91	2.28	11.83	50.80	0.85	51.65
40	22.26	2.53	0.67	0.32	0.06	1.06	0.91	11.51	2.41	12.49	54.22	0.90	55.12
45	24.12	2.78	0.71	0.32	0.06	1.06	0.91	12.19	2.55	13.23	57.92	0.95	58.87
50	26.06	3.08	0.75	0.32	0.07	1.06	0.91	12.96	2.71	14.06	61.96	1.01	62.97

Table VOC LCV 48 Financial Cost of Operation of LCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.49	1.52	0.38	0.36	0.01	1.22	1.04	8.09	1.69	8.78	32.58	0.63	33.21
5	10.95	1.61	0.42	0.36	0.02	1.22	1.04	8.42	1.76	9.13	34.93	0.66	35.58
10	12.45	1.70	0.46	0.36	0.03	1.22	1.04	8.78	1.84	9.52	37.38	0.68	38.07
15	13.98	1.81	0.50	0.36	0.03	1.22	1.04	9.17	1.92	9.94	39.96	0.71	40.68
20	15.56	1.94	0.53	0.36	0.04	1.22	1.04	9.59	2.01	10.40	42.68	0.75	43.43
25	17.19	2.08	0.57	0.36	0.04	1.22	1.04	10.06	2.10	10.91	45.56	0.78	46.35
30	18.87	2.24	0.61	0.36	0.05	1.22	1.04	10.57	2.21	11.47	48.63	0.82	49.45
35	20.61	2.43	0.64	0.36	0.05	1.22	1.04	11.14	2.33	12.09	51.91	0.87	52.78
40	22.41	2.66	0.68	0.36	0.06	1.22	1.04	11.77	2.46	12.77	55.44	0.92	56.36
45	24.30	2.94	0.72	0.36	0.06	1.22	1.04	12.49	2.61	13.55	59.27	0.97	60.25
50	26.28	3.27	0.76	0.36	0.07	1.22	1.04	13.29	2.78	14.42	63.48	1.04	64.52

Table VOC LCV 49 Financial Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.23	1.14	0.32	0.14	0.01	0.46	0.39	7.01	1.47	7.61	28.77	0.60	29.38
5	11.54	1.18	0.36	0.14	0.02	0.46	0.39	7.28	1.52	7.89	30.78	0.63	31.40
10	12.88	1.23	0.40	0.14	0.03	0.46	0.39	7.56	1.58	8.20	32.87	0.65	33.52
15	14.26	1.29	0.44	0.14	0.03	0.46	0.39	7.87	1.65	8.53	35.05	0.68	35.72
20	15.67	1.35	0.47	0.14	0.04	0.46	0.39	8.20	1.72	8.90	37.33	0.71	38.04
25	17.13	1.42	0.51	0.14	0.04	0.46	0.39	8.56	1.79	9.29	39.73	0.74	40.47
30	18.63	1.49	0.55	0.14	0.05	0.46	0.39	8.96	1.87	9.72	42.26	0.77	43.03
35	20.17	1.58	0.59	0.14	0.05	0.46	0.39	9.40	1.97	10.19	44.93	0.81	45.74
40	21.77	1.67	0.62	0.14	0.06	0.46	0.39	9.88	2.07	10.71	47.76	0.85	48.61
45	23.42	1.77	0.66	0.14	0.06	0.46	0.39	10.41	2.18	11.29	50.78	0.90	51.67
50	25.14	1.89	0.70	0.14	0.07	0.46	0.39	11.00	2.30	11.93	54.02	0.95	54.96

Table VOC LCV 50 Financial Cost of Operation of LCV on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.17	1.16	0.33	0.18	0.01	0.52	0.45	7.11	1.49	7.72	29.14	0.61	29.76
5	11.49	1.21	0.37	0.18	0.02	0.52	0.45	7.39	1.54	8.01	31.18	0.64	31.82
10	12.84	1.26	0.41	0.18	0.03	0.52	0.45	7.68	1.61	8.33	33.31	0.66	33.97
15	14.24	1.32	0.44	0.18	0.03	0.52	0.45	8.00	1.67	8.68	35.53	0.69	36.22
20	15.67	1.39	0.48	0.18	0.04	0.52	0.45	8.34	1.74	9.05	37.86	0.72	38.58
25	17.14	1.46	0.52	0.18	0.04	0.52	0.45	8.72	1.82	9.46	40.31	0.75	41.06
30	18.66	1.54	0.56	0.18	0.05	0.52	0.45	9.13	1.91	9.90	42.89	0.79	43.68
35	20.22	1.63	0.59	0.18	0.05	0.52	0.45	9.58	2.00	10.39	45.62	0.82	46.45
40	21.84	1.72	0.63	0.18	0.06	0.52	0.45	10.08	2.11	10.94	48.53	0.87	49.40
45	23.52	1.83	0.67	0.18	0.06	0.52	0.45	10.63	2.22	11.54	51.63	0.91	52.55
50	25.27	1.96	0.71	0.18	0.07	0.52	0.45	11.25	2.35	12.21	54.97	0.97	55.94

Table VOC LCV 51 Financial Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		_	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.11	1.19	0.34	0.21	0.01	0.60	0.52	7.22	1.51	7.83	29.55	0.62	30.17
5	11.44	1.24	0.38	0.21	0.02	0.60	0.52	7.50	1.57	8.14	31.62	0.65	32.26
10	12.82	1.30	0.41	0.21	0.03	0.60	0.52	7.80	1.63	8.47	33.78	0.67	34.45
15	14.22	1.36	0.45	0.21	0.03	0.60	0.52	8.13	1.70	8.82	36.05	0.70	36.75
20	15.67	1.43	0.49	0.21	0.04	0.60	0.52	8.49	1.78	9.21	38.43	0.73	39.16
25	17.16	1.50	0.53	0.21	0.04	0.60	0.52	8.88	1.86	9.63	40.93	0.76	41.69
30	18.70	1.58	0.56	0.21	0.05	0.60	0.52	9.30	1.95	10.09	43.57	0.80	44.37
35	20.28	1.68	0.60	0.21	0.05	0.60	0.52	9.77	2.04	10.60	46.37	0.84	47.21
40	21.92	1.78	0.64	0.21	0.06	0.60	0.52	10.29	2.15	11.17	49.35	0.89	50.24
45	23.63	1.90	0.68	0.21	0.06	0.60	0.52	10.87	2.27	11.80	52.55	0.94	53.48
50	25.41	2.04	0.71	0.21	0.07	0.60	0.52	11.52	2.41	12.50	55.99	0.99	56.98

Table VOC LCV 52 Financial Cost of Operation of LCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.06	1.22	0.35	0.25	0.01	0.69	0.60	7.33	1.53	7.95	29.99	0.63	30.62
5	11.41	1.27	0.38	0.25	0.02	0.69	0.60	7.62	1.59	8.26	32.10	0.66	32.75
10	12.79	1.33	0.42	0.25	0.03	0.69	0.60	7.93	1.66	8.60	34.30	0.68	34.98
15	14.22	1.39	0.46	0.25	0.03	0.69	0.60	8.27	1.73	8.97	36.61	0.71	37.32
20	15.68	1.47	0.50	0.25	0.04	0.69	0.60	8.64	1.81	9.37	39.03	0.74	39.78
25	17.19	1.55	0.53	0.25	0.04	0.69	0.60	9.04	1.89	9.81	41.59	0.78	42.37
30	18.74	1.64	0.57	0.25	0.05	0.69	0.60	9.49	1.98	10.29	44.30	0.82	45.11
35	20.35	1.73	0.61	0.25	0.05	0.69	0.60	9.97	2.09	10.82	47.17	0.86	48.03
40	22.02	1.85	0.65	0.25	0.06	0.69	0.60	10.52	2.20	11.41	50.23	0.90	51.14
45	23.75	1.98	0.68	0.25	0.06	0.69	0.60	11.12	2.33	12.07	53.52	0.96	54.48
50	25.56	2.12	0.72	0.25	0.07	0.69	0.60	11.80	2.47	12.80	57.08	1.01	58.10

Table VOC LCV 53 Financial Cost of Operation of LCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.01	1.25	0.35	0.28	0.01	0.80	0.69	7.44	1.56	8.07	30.47	0.64	31.11
5	11.38	1.30	0.39	0.28	0.02	0.80	0.69	7.74	1.62	8.40	32.61	0.67	33.28
10	12.78	1.36	0.43	0.28	0.03	0.80	0.69	8.06	1.69	8.75	34.86	0.69	35.55
15	14.21	1.43	0.47	0.28	0.03	0.80	0.69	8.41	1.76	9.13	37.21	0.72	37.94
20	15.70	1.51	0.50	0.28	0.04	0.80	0.69	8.79	1.84	9.54	39.69	0.76	40.45
25	17.22	1.59	0.54	0.28	0.04	0.80	0.69	9.21	1.93	10.00	42.31	0.79	43.10
30	18.80	1.69	0.58	0.28	0.05	0.80	0.69	9.67	2.02	10.50	45.08	0.83	45.91
35	20.43	1.80	0.62	0.28	0.05	0.80	0.69	10.18	2.13	11.05	48.02	0.88	48.90
40	22.12	1.92	0.65	0.28	0.06	0.80	0.69	10.75	2.25	11.66	51.18	0.92	52.10
45	23.88	2.05	0.69	0.28	0.06	0.80	0.69	11.38	2.38	12.35	54.57	0.98	55.55
50	25.73	2.21	0.73	0.28	0.07	0.80	0.69	12.09	2.53	13.12	58.25	1.04	59.29

Table VOC LCV 54 Financial Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.55	1.14	0.32	0.14	0.01	0.46	0.39	6.04	1.26	6.56	28.88	1.09	29.97
5	14.11	1.18	0.36	0.14	0.02	0.46	0.39	6.11	1.28	6.62	30.67	1.10	31.77
10	15.67	1.23	0.40	0.14	0.03	0.46	0.39	6.17	1.29	6.69	32.47	1.11	33.58
15	17.24	1.29	0.44	0.14	0.03	0.46	0.39	6.23	1.30	6.76	34.28	1.12	35.40
20	18.81	1.35	0.47	0.14	0.04	0.46	0.39	6.30	1.32	6.83	36.10	1.13	37.23
25	20.38	1,42	0.51	0.14	0.04	0.46	0.39	6.36	1.33	6.90	37.93	1.14	39.07
30	21.95	.49	0.55	0.14	0.05	0.46	0.39	6.43	1.34	6.97	39.78	1.16	40.93
35	23.53	.58	0.59	0.14	0.05	0.46	0.39	6.50	1.36	7.05	41.64	1.17	42.81
40	25.11	.67	0.62	0.14	0.06	0.46	0.39	6.57	1.37	7.13	43.52	1.18	44.70
45	26.70	.77	0.66	0.14	0.06	0.46	0.39	6.64	1.39	7.20	45.41	1.19	46.61
50	28.28	.89	0.70	0.14	0.07	0.46	0.39	6.71	1.40	7.28	47.33	1.21	48.53

Table VOC LCV 55 Financial Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.97	1.16	0.33	0.18	0.01	0.52	0.45	6.28	1.31	6.82	29.04	1.13	30.17
5	13.54	1.21	0.37	0.18	0.02	0.52	0.45	6.35	1.33	6.89	30.86	1.14	32.00
10	15.12	1.26	0.41	0.18	0.03	0.52	0.45	6.42	1.34	6.96	32.68	1.15	33.83
15	16.69	1.32	0.44	0.18	0.03	0.52	0.45	6.48	1.36	7.03	34.52	1.17	35.68
20	18.27	1.39	0.48	0.18	0.04	0.52	0.45	6.55	1.37	7.11	36.36	1.18	37.54
25	19.86	1.46	0.52	0.18	0.04	0.52	0.45	6.63	1.39	7.19	38.23	1.19	39.42
30	21.44	1.54	0.56	0.18	0.05	0.52	0.45	6.70	1.40	7.27	40.10	1.20	41.31
35	23.03	1.63	0.59	0.18	0.05	0.52	0.45	6.77	1.42	7.35	41.99	1.22	43.21
40	24.63	1.72	0.63	0.18	0.06	0.52	0.45	6.85	1.43	7.43	43.90	1.23	45.14
45	26.22	1.83	0.67	0.18	0.06	0.52	0.45	6.93	1.45	7.52	45.83	1.25	47.08
50	27.82	1.96	0.71	0.18	0.07	0.52	0.45	7.01	1.47	7.60	47.79	1.26	49.05

Table VOC LCV 56 Financial Cost of Operation of LCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.44	1.19	0.34	0.21	0.01	0.60	0.52	6.54	1.37	7.10	29.31	1.18	30.49
5	13.02	1.24	0.38	0.21	0.02	0.60	0.52	6.61	1.38	7.17	31.15	1.19	32.34
10	14.60	1.30	0.41	0.21	0.03	0.60	0.52	6.68	1.40	7.25	33.01	1.20	34.21
15	16.19	1.36	0.45	0.21	0.03	0.60	0.52	6.76	1.41	7.33	34.87	1.21	36.09
20	17.79	1.43	0.49	0.21	0.04	0.60	0.52	6.83	1.43	7.41	36.75	1.23	37.98
25	19.38	1.50	0.53	0.21	0.04	0.60	0.52	6.91	1.45	7.50	38.64	1.24	39.88
30	20.98	1.58	0.56	0.21	0.05	0.60	0.52	6.99	1.46	7.59	40.55	1.26	41.81
35	22.58	1.68	0.60	0.21	0.05	0.60	0.52	7.07	1.48	7.67	42.48	1.27	43.75
40	24.19	1.78	0.64	0.21	0.06	0.60	0.52	7.16	1.50	7.76	44.42	1.29	45.71
45	25.80	1.90	0.68	0.21	0.06	0.60	0.52	7.24	1.51	7.86	46.39	1.30	47.69
50	27.41	2.04	0.71	0.21	0.07	0.60	0.52	7.33	1.53	7.95	48.38	1.32	49.70

Table VOC LCV 57 Financial Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.06	0.88	0.32	0.14	0.01	0.39	0.33	5.89	1.23	6.39	28.65	1.06	29.71
5	14.61	0.91	0.36	0.14	0.02	0.39	0.33	5.95	1.24	6.45	30.40	1.07	31.47
10	16.16	0.94	0.39	0.14	0.03	0.39	0.33	6.01	1.26	6.52	32.17	1.08	33.25
15	17.72	0.98	0.43	0.14	0.03	0.39	0.33	6.07	1.27	6.58	33.94	1.09	35.03
20	19.28	1.01	0.47	0.14	0.04	0.39	0.33	6.13	1.28	6.65	35.72	1.10	36.82
25	20.85	1.05	0.51	0.14	0.04	0.39	0.33	6.19	1.29	6.72	37.50	1.11	38.62
30	22.41	1.09	0.54	0.14	0.05	0.39	0.33	6.26	1.31	6.79	39.30	1.12	40.42
35	23.98	1.13	0.58	0.14	0.05	0.39	0.33	6.32	1.32	6.86	41.10	1.14	42.24
40	25.55	1.18	0.62	0.14	0.06	0.39	0.33	6.39	1.34	6.93	42.92	1.15	44.07
45	27.13	1.23	0.66	0.14	0.06	0.39	0.33	6.45	1.35	7.00	44.74	1.16	45.90
50	28.71	1.28	0.69	0.14	0.07	0.39	0.33	6.52	1.36	7.08	46.58	1.17	47.75

Table VOC LCV 58 Financial Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.45	0.90	0.32	0.18	0.01	0.44	0.38	6.12	1.28	6.64	28.72	1.10	29.82
5	14.01	0.93	0.36	0.18	0.02	0.44	0.38	6.18	1.29	6.70	30.50	1.11	31.61
10	15.58	0.96	0.40	0.18	0.03	0.44	0.38	6.24	1.31	6.77	32.28	1.12	33.41
15	17.15	0.99	0.44	0.18	0.03	0.44	0.38	6.31	1.32	6.84	34.08	1.13	35.21
20	18.72	1.03	0.47	0.18	0.04	0.44	0.38	6.37	1.33	6.91	35.88	1.15	37.03
25	20.29	1.07	0.51	0.18	0.04	0.44	0.38	6.44	1.35	6.99	37.69	1.16	38.85
30	21.87	1.11	0.55	0.18	0.05	0.44	0.38	6.51	1.36	7.06	39.51	1.17	40.68
35	23.45	1.16	0.59	0.18	0.05	0.44	0.38	6.58	1.38	7.14	41.35	1.18	42.53
40	25.04	1.20	0.62	0.18	0.06	0.44	0.38	6.65	1.39	7.22	43.19	1.20	44.38
45	26.62	1.26	0.66	0.18	0.06	0.44	0.38	6.73	1.41	7.30	45.04	1.21	46.25
50	28.22	1.32	0.70	0.18	0.07	0.44	0.38	6.80	1.42	7.38	46.91	1.22	48.13

Table VOC LCV 59 Financial Cost of Operation of LCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.88	0.92	0.33	0.21	0.01	0.51	0.44	6.36	1.33	6.90	28.89	1.14	30.04
5	13.46	0.95	0.37	0.21	0.02	0.51	0.44	6.43	1.34	6.97	30.70	1.16	31.85
10	15.03	0.98	0.40	0.21	0.03	0.51	0.44	6.50	1.36	7.05	32.51	1.17	33.67
15	16.61	1.01	0.44	0.21	0.03	0.51	0.44	6.57	1.37	7.12	34.33	1.18	35.51
20	18.20	1.05	0.48	0.21	0.04	0.51	0.44	6.64	1.39	7.20	36.16	1.19	37.35
25	19.79	1.09	0.52	0.21	0.04	0.51	0.44	6.71	1.40	7.28	37.99	1.21	39.20
30	21.38	1.13	0.55	0.21	0.05	0.51	0.44	6.79	1.42	7.36	39.84	1.22	41.06
35	22.97	1.18	0.59	0.21	0.05	0.51	0.44	6.86	1.44	7.45	41.70	1.23	42.94
40	24.57	1.23	0.63	0.21	0.06	0.51	0.44	6.94	1.45	7.53	43.57	1.25	44.82
45	26.17	1.29	0.67	0.21	0.06	0.51	0.44	7.02	1.47	7.62	45.46	1.26	46.72
50	27.77	1.35	0.70	0.21	0.07	0.51	0.44	7.10	1.49	7.71	47.35	1.28	48.63

Table VOC LCV 60 Financial Cost of Operation of LCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.55	1.14	0.32	0.14	0.01	0.46	0.39	6.04	1.26	6.56	28.88	1.09	29.97
5	14.11	1.18	0.36	0.14	0.02	0.46	0.39	6.11	1.28	6.62	30.67	1.10	31.77
10	15.67	1.23	0.40	0.14	0.03	0.46	0.39	6.17	1.29	6.69	32.47	1.11	33.58
15	17.24	1.29	0.44	0.14	0.03	0.46	0.39	6.23	1.30	6.76	34.28	1.12	35.40
20	18.81	1.35	0.47	0.14	0.04	0.46	0.39	6.30	1.32	6.83	36.10	1.13	37.23
25	20.38	1.42	0.51	0.14	0.04	0.46	0.39	6.36	1.33	6.90	37.93	1.14	39.07
30	21.95	1.49	0.55	0.14	0.05	0.46	0.39	6.43	1.34	6.97	39.78	1.16	40.93
35	23.53	1.58	0.59	0.14	0.05	0.46	0.39	6.50	1.36	7.05	41.64	1.17	42.81
40	25.11	1.67	0.62	0.14	0.06	0.46	0.39	6.57	1.37	7.13	43.52	1.18	44.70
45	26.70	1.77	0.66	0.14	0.06	0.46	0.39	6.64	1.39	7.20	45.41	1.19	46.61
50	28.28	1.89	0.70	0.14	0.07	0.46	0.39	6.71	1.40	7.28	47.33	1.21	48.53

Table VOC LCV 61
Financial Cost of Operation of LCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.97	1.16	0.33	0.18	0.01	0.52	0.45	6.28	1.31	6.82	29.04	1.13	30.17
5	13.54	1.21	0.37	0.18	0.02	0.52	0.45	6.35	1.33	6.89	30.86	1.14	32.00
10	15.12	1.26	0.41	0.18	0.03	0.52	0.45	6.42	1.34	6.96	32.68	1.15	33.83
15	16.69	1.32	0.44	0.18	0.03	0.52	0.45	6.48	1.36	7.03	34.52	1.17	35.68
20	18.27	1.39	0.48	0.18	0.04	0.52	0.45	6.55	1.37	7.11	36.36	1.18	37.54
25	19.86	1.46	0.52	0.18	0.04	0.52	0.45	6.63	1.39	7.19	38.23	1.19	39.42
30	21.44	1.54	0.56	0.18	0.05	0.52	0.45	6.70	1.40	7.27	40.10	1.20	41.31
35	23.03	1.63	0.59	0.18	0.05	0.52	0.45	6.77	1.42	7.35	41.99	1.22	43.21
40	24.63	1.72	0.63	0.18	0.06	0.52	0.45	6.85	1.43	7.43	43.90	1.23	45.14
45	26.22	1.83	0.67	0.18	0.06	0.52	0.45	6.93	1.45	7.52	45.83	1.25	47.08
50	27.82	1.96	0.71	0.18	0.07	0.52	0.45	7.01	1.47	7.60	47.79	1.26	49.05

Table VOC LCV 62
Financial Cost of Operation of LCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.44	1.19	0.34	0.21	0.01	0.60	0.52	6.54	1.37	7.10	29.31	1.18	30.49
5	13.02	1.24	0.38	0.21	0.02	0.60	0.52	6.61	1.38	7.17	31.15	1.19	32.34
10	14.60	1.30	0.41	0.21	0.03	0.60	0.52	6.68	1.40	7.25	33.01	1.20	34.21
15	16.19	1.36	0.45	0.21	0.03	0.60	0.52	6.76	1.41	7.33	34.87	1.21	36.09
20	17.79	1.43	0.49	0.21	0.04	0.60	0.52	6.83	1.43	7.41	36.75	1.23	37.98
25	19.38	1.50	0.53	0.21	0.04	0.60	0.52	6.91	1.45	7.50	38.64	1.24	39.88
30	20.98	1.58	0.56	0.21	0.05	0.60	0.52	6.99	1.46	7.59	40.55	1.26	41.81
35	22.58	1.68	0.60	0.21	0.05	0.60	0.52	7.07	1.48	7.67	42.48	1.27	43.75
40	24.19	1.78	0.64	0.21	0.06	0.60	0.52	7.16	1.50	7.76	44.42	1.29	45.71
45	25.80	1.90	0.68	0.21	0.06	0.60	0.52	7.24	1.51	7.86	46.39	1.30	47.69
50	27.41	2.04	0.71	0.21	0.07	0.60	0.52	7.33	1.53	7.95	48.38	1.32	49.70

Table VOC LCV 63
Financial Cost of Operation of LCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	-	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.06	0.88	0.32	0.14	0.01	0.39	0.33	5.89	1.23	6.39	28.65	1.06	29.71
5	14.61	0.91	0.36	0.14	0.02	0.39	0.33	5.95	1.24	6.45	30.40	1.07	31.47
10	16.16	0.94	0.39	0.14	0.03	0.39	0.33	6.01	1.26	6.52	32.17	1.08	33.25
15	17.72	0.98	0.43	0.14	0.03	0.39	0.33	6.07	1.27	6.58	33.94	1.09	35.03
20	19.28	1.01	0.47	0.14	0.04	0.39	0.33	6.13	1.28	6.65	35.72	1.10	36.82
25	20.85	1.05	0.51	0.14	0.04	0.39	0.33	6.19	1.29	6.72	37.50	1.11	38.62
30	22.41	1.09	0.54	0.14	0.05	0.39	0.33	6.26	1.31	6.79	39.30	1.12	40.42
35	23.98	1.13	0.58	0.14	0.05	0.39	0.33	6.32	1.32	6.86	41.10	1.14	42.24
40	25.55	1.18	0.62	0.14	0.06	0.39	0.33	6.39	1.34	6.93	42.92	1.15	44.07
45	27.13	1.23	0.66	0.14	0.06	0.39	0.33	6.45	1.35	7.00	44.74	1.16	45.90
50	28.71	1.28	0.69	0.14	0.07	0.39	0.33	6.52	1.36	7.08	46.58	1.17	47.75

Table VOC LCV 64
Financial Cost of Operation of LCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.45	0.90	0.32	0.18	0.01	0.44	0.38	6.12	1.28	6.64	28.72	1.10	29.82
5	14.01	0.93	0.36	0.18	0.02	0.44	0.38	6.18	1.29	6.70	30.50	1.11	31.61
10	15.58	0.96	0.40	0.18	0.03	0.44	0.38	6.24	1.31	6.77	32.28	1.12	33.41
15	17.15	0.99	0.44	0.18	0.03	0.44	0.38	6.31	1.32	6.84	34.08	1.13	35.21
20	18.72	1.03	0.47	0.18	0.04	0.44	0.38	6.37	1.33	6.91	35.88	1.15	37.03
25	20.29	1.07	0.51	0.18	0.04	0.44	0.38	6.44	1.35	6.99	37.69	1.16	38.85
30	21.87	1.11	0.55	0.18	0.05	0.44	0.38	6.51	1.36	7.06	39.51	1.17	40.68
35	23.45	1.16	0.59	0.18	0.05	0.44	0.38	6.58	1.38	7.14	41.35	1.18	42.53
40	25.04	1.20	0.62	0.18	0.06	0.44	0.38	6.65	1.39	7.22	43.19	1.20	44.38
45	26.62	1.26	0.66	0.18	0.06	0.44	0.38	6.73	1.41	7.30	45.04	1.21	46.25
50	28.22	1.32	0.70	0.18	0.07	0.44	0.38	6.80	1.42	7.38	46.91	1.22	48.13

Table VOC LCV 65
Financial Cost of Operation of LCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.88	0.92	0.33	0.21	0.01	0.51	0.44	6.36	1.33	6.90	28.89	1.14	30.04
5	13.46	0.95	0.37	0.21	0.02	0.51	0.44	6.43	1.34	6.97	30.70	1.16	31.85
10	15.03	0.98	0.40	0.21	0.03	0.51	0.44	6.50	1.36	7.05	32.51	1.17	33.67
15	16.61	1.01	0.44	0.21	0.03	0.51	0.44	6.57	1.37	7.12	34.33	1.18	35.51
20	18.20	1.05	0.48	0.21	0.04	0.51	0.44	6.64	1.39	7.20	36.16	1.19	37.35
25	19.79	1.09	0.52	0.21	0.04	0.51	0.44	6.71	1.40	7.28	37.99	1.21	39.20
30	21.38	1.13	0.55	0.21	0.05	0.51	0.44	6.79	1.42	7.36	39.84	1.22	41.06
35	22.97	1.18	0.59	0.21	0.05	0.51	0.44	6.86	1.44	7.45	41.70	1.23	42.94
40	24.57	1.23	0.63	0.21	0.06	0.51	0.44	6.94	1.45	7.53	43.57	1.25	44.82
45	26.17	1.29	0.67	0.21	0.06	0.51	0.44	7.02	1.47	7.62	45.46	1.26	46.72
50	27.77	1.35	0.70	0.21	0.07	0.51	0.44	7.10	1.49	7.71	47.35	1.28	48.63

Table VOC LCV 66
Financial Cost of Operation of LCV on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.59	0.72	0.32	0.14	0.01	0.35	0.30	5.74	1.20	6.23	28.62	1.03	29.65
5	15.13	0.74	0.35	0.14	0.02	0.35	0.30	5.80	1.21	6.29	30.35	1.04	31.39
10	16.68	0.76	0.39	0.14	0.03	0.35	0.30	5.86	1.22	6.35	32.09	1.05	33.14
15	18.23	0.78	0.43	0.14	0.03	0.35	0.30	5.91	1.24	6.41	33.83	1.06	34.90
20	19.78	0.81	0.47	0.14	0.04	0.35	0.30	5.97	1.25	6.48	35.59	1.07	36.66
25	21.33	0.83	0.50	0.14	0.04	0.35	0.30	6.03	1.26	6.54	37.34	1.08	38.43
30	22.89	0.85	0.54	0.14	0.05	0.35	0.30	6.09	1.27	6.61	39.11	1.09	40.20
35	24.45	0.88	0.58	0.14	0.05	0.35	0.30	6.15	1.29	6.67	40.88	1.11	41.99
40	26.02	0.91	0.62	0.14	0.06	0.35	0.30	6.22	1.30	6.74	42.66	1.12	43.78
45	27.59	0.94	0.65	0.14	0.06	0.35	0.30	6.28	1.31	6.81	44.45	1.13	45.58
50	29.16	0.97	0.69	0.14	0.07	0.35	0.30	6.35	1.33	6.88	46.25	1.14	47.39

Table VOC LCV 67
Financial Cost of Operation of LCV on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF		Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.95	0.73	0.32	0.18	0.01	0.41	0.35	5.96	1.25	6.47	28.62	1.07	29.69
5	14.50	0.75	0.36	0.18	0.02	0.41	0.35	6.02	1.26	6.53	30.37	1.08	31.46
10	16.06	0.77	0.40	0.18	0.03	0.41	0.35	6.08	1.27	6.59	32.13	1.09	33.23
15	17.62	0.80	0.43	0.18	0.03	0.41	0.35	6.14	1.28	6.66	33.90	1.10	35.00
20	19.18	0.82	0.47	0.18	0.04	0.41	0.35	6.20	1.30	6.73	35.67	1.11	36.79
25	20.75	0.84	0.51	0.18	0.04	0.41	0.35	6.27	1.31	6.80	37.46	1.13	38.58
30	22.32	0.87	0.55	0.18	0.05	0.41	0.35	6.33	1.32	6.87	39.24	1.14	40.38
35	23.89	0.90	0.58	0.18	0.05	0.41	0.35	6.40	1.34	6.94	41.04	1.15	42.19
40	25.47	0.93	0.62	0.18	0.06	0.41	0.35	6.47	1.35	7.02	42.85	1.16	44.01
45	27.05	0.96	0.66	0.18	0.06	0.41	0.35	6.54	1.37	7.09	44.66	1.17	45.83
50	28.63	0.99	0.70	0.18	0.07	0.41	0.35	6.61	1.38	7.17	46.48	1.19	47.67

Table VOC LCV 68
Financial Cost of Operation of LCV on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF		, ,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.35	0.75	0.32	0.21	0.01	0.47	0.40	6.19	1.29	6.72	28.72	1.11	29.83
5	13.91	0.77	0.36	0.21	0.02	0.47	0.40	6.25	1.31	6.79	30.49	1.12	31.62
10	15.48	0.79	0.40	0.21	0.03	0.47	0.40	6.32	1.32	6.86	32.28	1.14	33.41
15	17.06	0.81	0.44	0.21	0.03	0.47	0.40	6.39	1.34	6.93	34.07	1.15	35.22
20	18.63	0.83	0.47	0.21	0.04	0.47	0.40	6.45	1.35	7.00	35.87	1.16	37.03
25	20.21	0.86	0.51	0.21	0.04	0.47	0.40	6.52	1.36	7.08	37.67	1.17	38.84
30	21.79	0.88	0.55	0.21	0.05	0.47	0.40	6.59	1.38	7.15	39.49	1.19	40.67
35	23.38	0.91	0.59	0.21	0.05	0.47	0.40	6.67	1.39	7.23	41.31	1.20	42.51
40	24.97	0.94	0.62	0.21	0.06	0.47	0.40	6.74	1.41	7.31	43.14	1.21	44.35
45	26.56	0.97	0.66	0.21	0.06	0.47	0.40	6.82	1.43	7.39	44.98	1.23	46.21
50	28.15	1.01	0.70	0.21	0.07	0.47	0.40	6.89	1.44	7.48	46.83	1.24	48.07

Table VOC HCV 1 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.16	3.64	0.21	0.09	0.02	2.39	1.89	4.64	0.78	7.53	27.36	0.92	28.28
5	6.27	3.85	0.23	0.09	0.02	2.39	1.89	4.81	0.81	7.81	28.18	0.95	29.13
10	6.41	4.08	0.26	0.09	0.03	2.39	1.89	4.99	0.84	8.10	29.08	0.99	30.07
15	6.58	4.35	0.28	0.09	0.04	2.39	1.89	5.19	0.87	8.42	30.09	1.03	31.12
20	6.78	4.65	0.30	0.09	0.04	2.39	1.89	5.40	0.90	8.76	31.21	1.07	32.28
25	7.03	5.00	0.33	0.09	0.05	2.39	1.89	5.63	0.94	9.13	32.47	1.11	33.59
30	7.32	5.40	0.35	0.09	0.06	2.39	1.89	5.88	0.98	9.54	33.89	1.16	35.05
35	7.66	5.87	0.38	0.09	0.06	2.39	1.89	6.15	1.03	9.98	35.50	1.22	36.71
40	8.07	6.43	0.40	0.09	0.07	2.39	1.89	6.45	1.08	10.46	37.33	1.28	38.61
45	8.56	7.11	0.42	0.09	0.08	2.39	1.89	6.78	1.14	11.00	39.45	1.34	40.79
50	9.15	7.95	0.45	0.09	0.08	2.39	1.89	7.14	1.20	11.59	41.93	1.41	43.34

Table VOC HCV 2 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.38	3.75	0.22	0.10	0.02	2.75	2.18	4.71	0.79	7.64	28.53	0.93	29.46
5	6.50	3.98	0.24	0.10	0.02	2.75	2.18	4.88	0.82	7.92	29.39	0.97	30.35
10	6.65	4.23	0.27	0.10	0.03	2.75	2.18	5.07	0.85	8.22	30.34	1.00	31.34
15	6.83	4.51	0.29	0.10	0.04	2.75	2.18	5.27	0.88	8.55	31.39	1.04	32.44
20	7.05	4.83	0.31	0.10	0.04	2.75	2.18	5.49	0.92	8.90	32.58	1.09	33.66
25	7.31	5.21	0.34	0.10	0.05	2.75	2.18	5.72	0.96	9.29	33.90	1.13	35.03
30	7.62	5.65	0.36	0.10	0.06	2.75	2.18	5.98	1.00	9.71	35.40	1.18	36.58
35	7.99	6.17	0.38	0.10	0.06	2.75	2.18	6.27	1.05	10.17	37.11	1.24	38.35
40	8.43	6.79	0.41	0.10	0.07	2.75	2.18	6.58	1.10	10.67	39.07	1.30	40.37
45	8.95	7.55	0.43	0.10	0.08	2.75	2.18	6.92	1.16	11.23	41.35	1.37	42.71
50	9.59	8.51	0.45	0.10	0.08	2.75	2.18	7.30	1.22	11.85	44.03	1.44	45.47

Table VOC HCV 3 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.60	3.87	0.23	0.10	0.02	3.17	2.51	4.78	0.80	7.75	29.82	0.94	30.76
5	6.73	4.11	0.25	0.10	0.02	3.17	2.51	4.95	0.83	8.04	30.72	0.98	31.70
10	6.89	4.38	0.28	0.10	0.03	3.17	2.51	5.15	0.86	8.35	31.71	1.02	32.73
15	7.09	4.68	0.30	0.10	0.04	3.17	2.51	5.35	0.90	8.69	32.82	1.06	33.88
20	7.32	5.03	0.32	0.10	0.04	3.17	2.51	5.58	0.93	9.05	34.07	1.10	35.17
25	7.60	5.44	0.35	0.10	0.05	3.17	2.51	5.82	0.98	9.45	35.47	1.15	36.62
30	7.93	5.92	0.37	0.10	0.06	3.17	2.51	6.09	1.02	9.89	37.06	1.20	38.26
35	8.33	6.49	0.39	0.10	0.06	3.17	2.51	6.39	1.07	10.36	38.87	1.26	40.14
40	8.80	7.19	0.42	0.10	0.07	3.17	2.51	6.71	1.12	10.89	40.97	1.33	42.30
45	9.37	8.05	0.44	0.10	0.08	3.17	2.51	7.07	1.18	11.47	43.43	1.40	44.83
50	10.05	9.15	0.46	0.10	0.08	3.17	2.51	7.46	1.25	12.11	46.35	1.48	47.83

Table VOC HCV 4 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.82	4.00	0.24	0.11	0.02	3.65	2.89	4.85	0.81	7.86	31.24	0.96	32.20
5	6.96	4.25	0.26	0.11	0.02	3.65	2.89	5.03	0.84	8.16	32.18	0.99	33.17
10	7.14	4.54	0.28	0.11	0.03	3.65	2.89	5.23	0.88	8.48	33.22	1.03	34.26
15	7.35	4.87	0.31	0.11	0.04	3.65	2.89	5.44	0.91	8.83	34.39	1.08	35.47
20	7.60	5.25	0.33	0.11	0.04	3.65	2.89	5.67	0.95	9.21	35.70	1.12	36.83
25	7.90	5.70	0.36	0.11	0.05	3.65	2.89	5.93	0.99	9.62	37.19	1.17	38.36
30	8.25	6.23	0.38	0.11	0.06	3.65	2.89	6.21	1.04	10.07	38.88	1.23	40.10
35	8.68	6.86	0.40	0.11	0.06	3.65	2.89	6.51	1.09	10.57	40.82	1.29	42.10
40	9.19	7.64	0.43	0.11	0.07	3.65	2.89	6.85	1.15	11.11	43.07	1.35	44.43
45	9.80	8.62	0.45	0.11	0.08	3.65	2.89	7.22	1.21	11.72	45.73	1.43	47.16
50	10.54	9.89	0.47	0.11	0.08	3.65	2.89	7.64	1.28	12.39	48.93	1.51	50.44

Table VOC HCV 5 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	7.05	4.14	0.25	0.11	0.02	4.20	3.32	4.92	0.82	7.98	32.81	0.97	33.78
5	7.20	4.41	0.27	0.11	0.02	4.20	3.32	5.11	0.86	8.29	33.79	1.01	34.80
10	7.39	4.72	0.29	0.11	0.03	4.20	3.32	5.31	0.89	8.62	34.89	1.05	35.94
15	7.62	5.07	0.32	0.11	0.04	4.20	3.32	5.53	0.93	8.98	36.12	1.09	37.22
20	7.89	5.49	0.34	0.11	0.04	4.20	3.32	5.77	0.97	9.37	37.51	1.14	38.65
25	8.21	5.98	0.36	0.11	0.05	4.20	3.32	6.04	1.01	9.80	39.08	1.19	40.27
30	8.59	6.56	0.39	0.11	0.06	4.20	3.32	6.32	1.06	10.26	40.88	1.25	42.13
35	9.04	7.27	0.41	0.11	0.06	4.20	3.32	6.64	1.11	10.78	42.96	1.31	44.27
40	9.59	8.15	0.43	0.11	0.07	4.20	3.32	6.99	1.17	11.35	45.40	1.38	46.78
45	10.25	9.28	0.46	0.11	0.08	4.20	3.32	7.38	1.24	11.98	48.30	1.46	49.76
50	11.05	10.77	0.48	0.11	0.08	4.20	3.32	7.82	1.31	12.68	51.83	1.55	53.38

Table VOC HCV 6 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	7.28	4.28	0.26	0.12	0.02	4.84	3.83	4.99	0.84	8.10	34.55	0.99	35.53
5	7.45	4.57	0.28	0.12	0.02	4.84	3.83	5.19	0.87	8.42	35.58	1.03	36.61
10	7.65	4.91	0.30	0.12	0.03	4.84	3.83	5.40	0.90	8.76	36.74	1.07	37.80
15	7.89	5.29	0.33	0.12	0.04	4.84	3.83	5.63	0.94	9.13	38.03	1.11	39.15
20	8.18	5.75	0.35	0.12	0.04	4.84	3.83	5.88	0.98	9.54	39.50	1.16	40.66
25	8.52	6.29	0.37	0.12	0.05	4.84	3.83	6.15	1.03	9.98	41.18	1.22	42.39
30	8.93	6.94	0.40	0.12	0.06	4.84	3.83	6.45	1.08	10.46	43.10	1.28	44.37
35	9.42	7.73	0.42	0.12	0.06	4.84	3.83	6.78	1.14	11.00	45.34	1.34	46.68
40	10.01	8.74	0.44	0.12	0.07	4.84	3.83	7.14	1.20	11.59	47.98	1.41	49.39
45	10.72	10.05	0.47	0.12	0.08	4.84	3.83	7.55	1.26	12.25	51.16	1.49	52.65
50	11.59	11.81	0.49	0.12	0.08	4.84	3.83	8.00	1.34	12.99	55.10	1.58	56.68

Table VOC HCV 7 Economic Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	7.51	4.44	0.26	0.12	0.02	5.57	4.41	5.07	0.85	8.22	36.48	1.00	37.48
5	7.70	4.75	0.29	0.12	0.02	5.57	4.41	5.27	0.88	8.55	37.57	1.04	38.61
10	7.91	5.11	0.31	0.12	0.03	5.57	4.41	5.49	0.92	8.90	38.79	1.09	39.87
15	8.17	5.54	0.33	0.12	0.04	5.57	4.41	5.72	0.96	9.29	40.16	1.13	41.29
20	8.48	6.03	0.36	0.12	0.04	5.57	4.41	5.98	1.00	9.71	41.72	1.18	42.90
25	8.85	6.63	0.38	0.12	0.05	5.57	4.41	6.26	1.05	10.17	43.50	1.24	44.74
30	9.29	7.35	0.41	0.12	0.06	5.57	4.41	6.58	1.10	10.67	45.56	1.30	46.86
35	9.82	8.26	0.43	0.12	0.06	5.57	4.41	6.92	1.16	11.23	47.98	1.37	49.35
40	10.45	9.42	0.45	0.12	0.07	5.57	4.41	7.30	1.22	11.85	50.86	1.44	52.31
45	11.22	10.95	0.48	0.12	0.08	5.57	4.41	7.72	1.29	12.54	54.38	1.53	55.91
50	12.16	13.09	0.50	0.12	0.08	5.57	4.41	8.20	1.37	13.31	58.83	1.62	60.45

Table VOC HCV 8 Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.88	3.05	0.21	0.09	0.02	1.78	1.40	4.30	0.72	6.98	24.44	0.85	25.29
5	5.95	3.20	0.23	0.09	0.02	1.78	1.40	4.46	0.75	7.24	25.13	0.88	26.02
10	6.05	3.36	0.25	0.09	0.03	1.78	1.40	4.63	0.78	7.52	25.90	0.92	26.82
15	6.18	3.53	0.28	0.09	0.04	1.78	1.40	4.82	0.81	7.82	26.75	0.95	27.71
20	6.34	3.73	0.30	0.09	0.04	1.78	1.40	5.02	0.84	8.15	27.70	0.99	28.69
25	6.54	3.95	0.32	0.09	0.05	1.78	1.40	5.24	0.88	8.50	28.75	1.04	29.79
30	6.78	4.20	0.35	0.09	0.06	1.78	1.40	5.48	0.92	8.89	29.94	1.08	31.02
35	7.07	4.48	0.37	0.09	0.06	1.78	1.40	5.74	0.96	9.31	31.27	1.13	32.40
40	7.42	4.80	0.39	0.09	0.07	1.78	1.40	6.02	1.01	9.78	32.77	1.19	33.96
45	7.85	5.16	0.42	0.09	0.08	1.78	1.40	6.34	1.06	10.29	34.48	1.25	35.73
50	8.37	5.60	0.44	0.09	0.08	1.78	1.40	6.69	1.12	10.86	36.44	1.32	37.76

Table VOC HCV 9
Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.08	3.13	0.21	0.10	0.02	2.04	1.62	4.37	0.73	7.08	25.38	0.86	26.25
5	6.16	3.28	0.23	0.10	0.02	2.04	1.62	4.53	0.76	7.35	26.11	0.90	27.00
10	6.27	3.45	0.26	0.10	0.03	2.04	1.62	4.71	0.79	7.64	26.91	0.93	27.84
15	6.41	3.64	0.28	0.10	0.04	2.04	1.62	4.90	0.82	7.95	27.80	0.97	28.77
20	6.59	3.85	0.31	0.10	0.04	2.04	1.62	5.11	0.86	8.29	28.79	1.01	29.80
25	6.80	4.08	0.33	0.10	0.05	2.04	1.62	5.33	0.89	8.65	29.90	1.05	30.95
30	7.06	4.35	0.35	0.10	0.06	2.04	1.62	5.58	0.93	9.05	31.14	1.10	32.25
35	7.38	4.65	0.38	0.10	0.06	2.04	1.62	5.85	0.98	9.49	32.54	1.16	33.70
40	7.76	4.99	0.40	0.10	0.07	2.04	1.62	6.15	1.03	9.98	34.13	1.22	35.35
45	8.22	5.39	0.42	0.10	0.08	2.04	1.62	6.48	1.09	10.51	35.94	1.28	37.22
50	8.77	5.86	0.45	0.10	0.08	2.04	1.62	6.85	1.15	11.11	38.03	1.35	39.38

Table VOC HCV 10 Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.28	3.21	0.22	0.10	0.02	2.36	1.86	4.43	0.74	7.19	26.41	0.88	27.29
5	6.38	3.38	0.24	0.10	0.02	2.36	1.86	4.60	0.77	7.46	27.17	0.91	28.08
10	6.50	3.55	0.26	0.10	0.03	2.36	1.86	4.78	0.80	7.76	28.01	0.95	28.95
15	6.65	3.75	0.29	0.10	0.04	2.36	1.86	4.98	0.83	8.08	28.94	0.98	29.93
20	6.84	3.97	0.31	0.10	0.04	2.36	1.86	5.19	0.87	8.43	29.98	1.03	31.01
25	7.07	4.22	0.33	0.10	0.05	2.36	1.86	5.43	0.91	8.81	31.14	1.07	32.22
30	7.35	4.51	0.36	0.10	0.06	2.36	1.86	5.68	0.95	9.22	32.45	1.12	33.58
35	7.69	4.83	0.38	0.10	0.06	2.36	1.86	5.96	1.00	9.68	33.93	1.18	35.11
40	8.10	5.21	0.41	0.10	0.07	2.36	1.86	6.27	1.05	10.18	35.61	1.24	36.85
45	8.60	5.64	0.43	0.10	0.08	2.36	1.86	6.62	1.11	10.74	37.54	1.31	38.85
50	9.20	6.16	0.45	0.10	0.08	2.36	1.86	7.00	1.17	11.37	39.76	1.38	41.15

Table VOC HCV 11 Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.49	3.30	0.22	0.11	0.02	2.71	2.15	4.49	0.75	7.29	27.54	0.89	28.43
5	6.59	3.47	0.25	0.11	0.02	2.71	2.15	4.67	0.78	7.58	28.33	0.92	29.26
10	6.73	3.66	0.27	0.11	0.03	2.71	2.15	4.86	0.81	7.88	29.21	0.96	30.17
15	6.90	3.87	0.29	0.11	0.04	2.71	2.15	5.06	0.85	8.21	30.19	1.00	31.19
20	7.10	4.11	0.32	0.11	0.04	2.71	2.15	5.28	0.89	8.57	31.28	1.04	32.32
25	7.35	4.38	0.34	0.11	0.05	2.71	2.15	5.53	0.93	8.97	32.50	1.09	33.59
30	7.65	4.68	0.36	0.11	0.06	2.71	2.15	5.79	0.97	9.40	33.88	1.15	35.02
35	8.02	5.03	0.39	0.11	0.06	2.71	2.15	6.08	1.02	9.87	35.44	1.20	36.64
40	8.46	5.44	0.41	0.11	0.07	2.71	2.15	6.41	1.07	10.40	37.22	1.27	38.49
45	9.00	5.92	0.43	0.11	0.08	2.71	2.15	6.77	1.13	10.98	39.27	1.34	40.61
50	9.65	6.49	0.46	0.11	0.08	2.71	2.15	7.17	1.20	11.63	41.65	1.42	43.07

Table VOC HCV 12 Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.70	3.39	0.23	0.11	0.02	3.12	2.47	4.56	0.76	7.40	28.78	0.90	29.68
5	6.82	3.57	0.25	0.11	0.02	3.12	2.47	4.74	0.79	7.70	29.61	0.94	30.55
10	6.96	3.77	0.28	0.11	0.03	3.12	2.47	4.94	0.83	8.01	30.53	0.98	31.50
15	7.14	4.00	0.30	0.11	0.04	3.12	2.47	5.15	0.86	8.35	31.55	1.02	32.57
20	7.37	4.25	0.32	0.11	0.04	3.12	2.47	5.38	0.90	8.73	32.70	1.06	33.76
25	7.64	4.54	0.35	0.11	0.05	3.12	2.47	5.63	0.94	9.13	33.98	1.11	35.10
30	7.96	4.87	0.37	0.11	0.06	3.12	2.47	5.90	0.99	9.58	35.44	1.17	36.61
35	8.36	5.25	0.39	0.11	0.06	3.12	2.47	6.21	1.04	10.07	37.09	1.23	38.32
40	8.83	5.69	0.42	0.11	0.07	3.12	2.47	6.54	1.10	10.62	38.98	1.29	40.28
45	9.41	6.22	0.44	0.11	0.08	3.12	2.47	6.92	1.16	11.23	41.17	1.37	42.54
50	10.12	6.86	0.46	0.11	0.08	3.12	2.47	7.34	1.23	11.91	43.72	1.45	45.17

Table VOC HCV 13
Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.92	3.49	0.24	0.12	0.02	3.60	2.85	4.63	0.78	7.52	30.15	0.92	31.06
5	7.04	3.68	0.26	0.12	0.02	3.60	2.85	4.82	0.81	7.82	31.01	0.95	31.97
10	7.20	3.90	0.28	0.12	0.03	3.60	2.85	5.02	0.84	8.14	31.98	0.99	32.97
15	7.40	4.13	0.31	0.12	0.04	3.60	2.85	5.24	0.88	8.50	33.05	1.04	34.09
20	7.64	4.41	0.33	0.12	0.04	3.60	2.85	5.47	0.92	8.88	34.26	1.08	35.34
25	7.93	4.72	0.35	0.12	0.05	3.60	2.85	5.73	0.96	9.31	35.61	1.13	36.75
30	8.28	5.07	0.38	0.12	0.06	3.60	2.85	6.02	1.01	9.77	37.15	1.19	38.34
35	8.71	5.49	0.40	0.12	0.06	3.60	2.85	6.34	1.06	10.28	38.90	1.25	40.16
40	9.22	5.97	0.42	0.12	0.07	3.60	2.85	6.69	1.12	10.85	40.92	1.32	42.24
45	9.85	6.56	0.45	0.12	0.08	3.60	2.85	7.08	1.19	11.49	43.25	1.40	44.65
50	10.62	7.27	0.47	0.12	0.08	3.60	2.85	7.52	1.26	12.21	46.00	1.49	47.48

Table VOC HCV 14
Economic Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	7.14	3.59	0.24	0.12	0.02	4.14	3.28	4.70	0.79	7.63	31.66	0.93	32.59
5	7.28	3.80	0.27	0.12	0.02	4.14	3.28	4.89	0.82	7.94	32.57	0.97	33.53
10	7.45	4.02	0.29	0.12	0.03	4.14	3.28	5.10	0.85	8.28	33.58	1.01	34.58
15	7.66	4.28	0.31	0.12	0.04	4.14	3.28	5.33	0.89	8.65	34.70	1.05	35.76
20	7.92	4.57	0.34	0.12	0.04	4.14	3.28	5.57	0.93	9.05	35.97	1.10	37.07
25	8.24	4.91	0.36	0.12	0.05	4.14	3.28	5.84	0.98	9.48	37.40	1.16	38.56
30	8.62	5.29	0.38	0.12	0.06	4.14	3.28	6.14	1.03	9.97	39.03	1.21	40.25
35	9.07	5.75	0.41	0.12	0.06	4.14	3.28	6.47	1.08	10.50	40.89	1.28	42.17
40	9.63	6.28	0.43	0.12	0.07	4.14	3.28	6.84	1.15	11.10	43.04	1.35	44.39
45	10.31	6.93	0.45	0.12	0.08	4.14	3.28	7.25	1.21	11.77	45.55	1.43	46.98
50	11.15	7.73	0.48	0.12	0.08	4.14	3.28	7.71	1.29	12.52	48.51	1.53	50.03

Table VOC HCV 15 Economic Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.74	2.68	0.20	0.09	0.02	1.55	1.23	4.09	0.69	6.64	22.93	0.97	23.90
5	5.79	2.79	0.23	0.09	0.02	1.55	1.23	4.25	0.71	6.89	23.55	1.01	24.56
10	5.86	2.91	0.25	0.09	0.03	1.55	1.23	4.41	0.74	7.16	24.24	1.04	25.28
15	5.96	3.05	0.27	0.09	0.04	1.55	1.23	4.59	0.77	7.45	25.00	1.09	26.09
20	6.10	3.19	0.30	0.09	0.04	1.55	1.23	4.79	0.80	7.77	25.85	1.13	26.98
25	6.26	3.35	0.32	0.09	0.05	1.55	1.23	5.00	0.84	8.11	26.80	1.18	27.98
30	6.47	3.52	0.34	0.09	0.06	1.55	1.23	5.23	0.88	8.48	27.86	1.24	29.09
35	6.73	3.72	0.37	0.09	0.06	1.55	1.23	5.48	0.92	8.89	29.04	1.30	30.34
40	7.05	3.94	0.39	0.09	0.07	1.55	1.23	5.76	0.96	9.35	30.39	1.36	31.75
45	7.44	4.18	0.41	0.09	0.08	1.55	1.23	6.07	1.02	9.85	31.91	1.44	33.35
50	7.91	4.46	0.44	0.09	0.08	1.55	1.23	6.41	1.07	10.41	33.65	1.52	35.17

Table VOC HCV 16 Economic Cost of Operation of HCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.93	2.74	0.21	0.10	0.02	1.78	1.41	4.15	0.70	6.74	23.78	0.98	24.76
5	5.99	2.86	0.23	0.10	0.02	1.78	1.41	4.31	0.72	7.00	24.43	1.02	25.45
10	6.07	2.98	0.25	0.10	0.03	1.78	1.41	4.48	0.75	7.27	25.14	1.06	26.20
15	6.18	3.12	0.28	0.10	0.04	1.78	1.41	4.67	0.78	7.57	25.94	1.10	27.05
20	6.33	3.28	0.30	0.10	0.04	1.78	1.41	4.87	0.82	7.90	26.83	1.15	27.98
25	6.51	3.44	0.32	0.10	0.05	1.78	1.41	5.09	0.85	8.25	27.82	1.20	29.02
30	6.74	3.63	0.35	0.10	0.06	1.78	1.41	5.33	0.89	8.64	28.93	1.26	30.19
35	7.02	3.84	0.37	0.10	0.06	1.78	1.41	5.59	0.94	9.07	30.18	1.32	31.51
40	7.37	4.07	0.40	0.10	0.07	1.78	1.41	5.88	0.98	9.54	31.60	1.39	32.99
45	7.78	4.33	0.42	0.10	0.08	1.78	1.41	6.20	1.04	10.06	33.21	1.47	34.67
50	8.30	4.63	0.44	0.10	0.08	1.78	1.41	6.56	1.10	10.64	35.05	1.55	36.60

Table VOC HCV 17 Economic Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.12	2.80	0.21	0.10	0.02	2.06	1.63	4.21	0.71	6.84	24.70	1.00	25.70
5	6.19	2.93	0.24	0.10	0.02	2.06	1.63	4.38	0.73	7.10	25.38	1.04	26.41
10	6.29	3.06	0.26	0.10	0.03	2.06	1.63	4.55	0.76	7.39	26.13	1.08	27.20
15	6.41	3.21	0.28	0.10	0.04	2.06	1.63	4.74	0.79	7.70	26.96	1.12	28.08
20	6.57	3.37	0.31	0.10	0.04	2.06	1.63	4.95	0.83	8.04	27.89	1.17	29.06
25	6.77	3.54	0.33	0.10	0.05	2.06	1.63	5.18	0.87	8.40	28.93	1.23	30.16
30	7.02	3.74	0.35	0.10	0.06	2.06	1.63	5.43	0.91	8.81	30.10	1.28	31.38
35	7.32	3.96	0.38	0.10	0.06	2.06	1.63	5.70	0.95	9.25	31.42	1.35	32.76
40	7.70	4.21	0.40	0.10	0.07	2.06	1.63	6.00	1.01	9.74	32.91	1.42	34.33
45	8.15	4.49	0.42	0.10	0.08	2.06	1.63	6.34	1.06	10.28	34.61	1.50	36.11
50	8.70	4.81	0.45	0.10	0.08	2.06	1.63	6.71	1.12	10.89	36.56	1.59	38.15

Table VOC HCV 18 Economic Cost of Operation of HCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.32	2.87	0.22	0.11	0.02	2.37	1.87	4.28	0.72	6.94	25.71	1.01	26.72
5	6.40	3.00	0.24	0.11	0.02	2.37	1.87	4.45	0.74	7.22	26.41	1.05	27.47
10	6.50	3.14	0.26	0.11	0.03	2.37	1.87	4.63	0.78	7.51	27.20	1.10	28.29
15	6.64	3.29	0.29	0.11	0.04	2.37	1.87	4.82	0.81	7.83	28.07	1.14	29.21
20	6.82	3.46	0.31	0.11	0.04	2.37	1.87	5.04	0.84	8.18	29.05	1.19	30.24
25	7.04	3.65	0.33	0.11	0.05	2.37	1.87	5.27	0.88	8.56	30.14	1.25	31.39
30	7.31	3.86	0.36	0.11	0.06	2.37	1.87	5.53	0.93	8.98	31.37	1.31	32.67
35	7.64	4.10	0.38	0.11	0.06	2.37	1.87	5.82	0.97	9.44	32.75	1.38	34.13
40	8.04	4.36	0.40	0.11	0.07	2.37	1.87	6.13	1.03	9.95	34.33	1.45	35.78
45	8.53	4.66	0.43	0.11	0.08	2.37	1.87	6.48	1.09	10.52	36.13	1.53	37.66
50	9.13	5.01	0.45	0.11	0.08	2.37	1.87	6.87	1.15	11.16	38.21	1.63	39.84

Table VOC HCV 19 Economic Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	3	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	6.52	2.94	0.22	0.11	0.02	2.73	2.16	4.34	0.73	7.05	26.81	1.03	27.84
5	6.61	3.07	0.25	0.11	0.02	2.73	2.16	4.52	0.76	7.33	27.55	1.07	28.62
10	6.73	3.22	0.27	0.11	0.03	2.73	2.16	4.70	0.79	7.63	28.37	1.11	29.48
15	6.88	3.38	0.29	0.11	0.04	2.73	2.16	4.91	0.82	7.96	29.29	1.16	30.45
20	7.07	3.56	0.32	0.11	0.04	2.73	2.16	5.13	0.86	8.33	30.31	1.21	31.52
25	7.31	3.76	0.34	0.11	0.05	2.73	2.16	5.37	0.90	8.72	31.45	1.27	32.73
30	7.60	3.99	0.36	0.11	0.06	2.73	2.16	5.64	0.94	9.15	32.75	1.34	34.08
35	7.96	4.24	0.39	0.11	0.06	2.73	2.16	5.94	0.99	9.63	34.21	1.41	35.61
40	8.39	4.52	0.41	0.11	0.07	2.73	2.16	6.27	1.05	10.17	35.87	1.48	37.36
45	8.93	4.85	0.43	0.11	0.08	2.73	2.16	6.63	1.11	10.76	37.79	1.57	39.36
50	9.58	5.23	0.46	0.11	0.08	2.73	2.16	7.04	1.18	11.43	40.00	1.67	41.67

Table VOC HCV 20 Economic Cost of Operation of HCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.54	2.68	0.20	0.09	0.02	1.55	1.23	3.33	0.56	5.40	20.59	3.90	24.49
5	5.47	2.79	0.23	0.09	0.02	1.55	1.23	3.46	0.58	5.61	21.04	4.06	25.09
10	5.44	2.91	0.25	0.09	0.03	1.55	1.23	3.60	0.60	5.84	21.54	4.22	25.76
15	5.42	3.05	0.27	0.09	0.04	1.55	1.23	3.75	0.63	6.09	22.12	4.40	26.52
20	5.44	3.19	0.30	0.09	0.04	1.55	1.23	3.92	0.66	6.36	22.78	4.60	27.38
25	5.49	3.35	0.32	0.09	0.05	1.55	1.23	4.10	0.69	6.66	23.52	4.81	28.34
30	5.57	3.52	0.34	0.09	0.06	1.55	1.23	4.30	0.72	6.98	24.37	5.05	29.42
35	5.70	3.72	0.37	0.09	0.06	1.55	1.23	4.53	0.76	7.34	25.34	5.31	30.65
40	5.87	3.94	0.39	0.09	0.07	1.55	1.23	4.77	0.80	7.74	26.45	5.60	32.05
45	6.11	4.18	0.41	0.09	0.08	1.55	1.23	5.04	0.84	8.19	27.73	5.92	33.64
50	6.41	4.46	0.44	0.09	0.08	1.55	1.23	5.35	0.90	8.68	29.20	6.28	35.47

Table VOC HCV 21 Economic Cost of Operation of HCV on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.68	2.74	0.21	0.10	0.02	1.78	1.41	3.38	0.57	5.48	21.37	3.96	25.33
5	5.63	2.86	0.23	0.10	0.02	1.78	1.41	3.51	0.59	5.70	21.84	4.12	25.96
10	5.60	2.98	0.25	0.10	0.03	1.78	1.41	3.66	0.61	5.94	22.37	4.29	26.67
15	5.60	3.12	0.28	0.10	0.04	1.78	1.41	3.82	0.64	6.20	22.98	4.48	27.46
20	5.63	3.28	0.30	0.10	0.04	1.78	1.41	3.99	0.67	6.48	23.68	4.68	28.36
25	5.69	3.44	0.32	0.10	0.05	1.78	1.41	4.18	0.70	6.78	24.47	4.90	29.37
30	5.79	3.63	0.35	0.10	0.06	1.78	1.41	4.39	0.74	7.12	25.36	5.15	30.51
35	5.93	3.84	0.37	0.10	0.06	1.78	1.41	4.62	0.77	7.50	26.39	5.42	31.81
40	6.13	4.07	0.40	0.10	0.07	1.78	1.41	4.88	0.82	7.91	27.57	5.72	33.28
45	6.39	4.33	0.42	0.10	0.08	1.78	1.41	5.16	0.86	8.38	28.92	6.05	34.97
50	6.73	4.63	0.44	0.10	0.08	1.78	1.41	5.48	0.92	8.90	30.48	6.43	36.91

Table VOC HCV 22 Economic Cost of Operation of HCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.83	2.80	0.21	0.10	0.02	2.06	1.63	3.43	0.57	5.57	22.22	4.02	26.25
5	5.79	2.93	0.24	0.10	0.02	2.06	1.63	3.57	0.60	5.79	22.72	4.19	26.91
10	5.77	3.06	0.26	0.10	0.03	2.06	1.63	3.72	0.62	6.04	23.28	4.36	27.65
15	5.78	3.21	0.28	0.10	0.04	2.06	1.63	3.88	0.65	6.30	23.93	4.56	28.48
20	5.82	3.37	0.31	0.10	0.04	2.06	1.63	4.06	0.68	6.59	24.66	4.77	29.43
25	5.90	3.54	0.33	0.10	0.05	2.06	1.63	4.26	0.71	6.91	25.49	5.00	30.49
30	6.01	3.74	0.35	0.10	0.06	2.06	1.63	4.48	0.75	7.27	26.44	5.25	31.69
35	6.18	3.96	0.38	0.10	0.06	2.06	1.63	4.72	0.79	7.66	27.53	5.53	33.06
40	6.40	4.21	0.40	0.10	0.07	2.06	1.63	4.98	0.84	8.09	28.77	5.85	34.62
45	6.69	4.49	0.42	0.10	0.08	2.06	1.63	5.28	0.89	8.58	30.21	6.20	36.41
50	7.07	4.81	0.45	0.10	0.08	2.06	1.63	5.62	0.94	9.12	31.88	6.59	38.47

Table VOC HCV 23 Economic Cost of Operation of HCV on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.55	2.09	0.20	0.09	0.02	1.31	1.04	3.25	0.54	5.28	19.37	3.81	23.19
5	5.48	2.15	0.22	0.09	0.02	1.31	1.04	3.38	0.57	5.48	19.74	3.96	23.70
10	5.42	2.23	0.25	0.09	0.03	1.31	1.04	3.51	0.59	5.70	20.17	4.12	24.28
15	5.40	2.30	0.27	0.09	0.04	1.31	1.04	3.66	0.61	5.93	20.65	4.29	24.94
20	5.39	2.38	0.29	0.09	0.04	1.31	1.04	3.81	0.64	6.19	21.20	4.47	25.68
25	5.42	2.47	0.32	0.09	0.05	1.31	1.04	3.99	0.67	6.47	21.83	4.68	26.51
30	5.48	2.57	0.34	0.09	0.06	1.31	1.04	4.18	0.70	6.78	22.54	4.90	27.44
35	5.58	2.67	0.36	0.09	0.06	1.31	1.04	4.38	0.73	7.12	23.35	5.14	28.50
40	5.72	2.78	0.39	0.09	0.07	1.31	1.04	4.61	0.77	7.49	24.28	5.41	29.69
45	5.92	2.90	0.41	0.09	0.08	1.31	1.04	4.87	0.82	7.90	25.34	5.71	31.05
50	6.18	3.03	0.43	0.09	0.08	1.31	1.04	5.16	0.86	8.37	26.56	6.05	32.61

Table VOC HCV 24 Economic Cost of Operation of HCV on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.69	2.12	0.20	0.10	0.02	1.51	1.20	3.30	0.55	5.35	20.05	3.87	23.92
5	5.63	2.19	0.23	0.10	0.02	1.51	1.20	3.43	0.57	5.56	20.44	4.02	24.46
10	5.58	2.27	0.25	0.10	0.03	1.51	1.20	3.57	0.60	5.79	20.89	4.18	25.07
15	5.56	2.35	0.27	0.10	0.04	1.51	1.20	3.72	0.62	6.03	21.40	4.36	25.76
20	5.57	2.43	0.30	0.10	0.04	1.51	1.20	3.88	0.65	6.30	21.98	4.55	26.53
25	5.61	2.52	0.32	0.10	0.05	1.51	1.20	4.06	0.68	6.59	22.64	4.76	27.40
30	5.69	2.62	0.34	0.10	0.06	1.51	1.20	4.26	0.71	6.91	23.39	4.99	28.39
35	5.81	2.73	0.37	0.10	0.06	1.51	1.20	4.47	0.75	7.26	24.25	5.25	29.50
40	5.97	2.84	0.39	0.10	0.07	1.51	1.20	4.71	0.79	7.65	25.23	5.53	30.76
45	6.19	2.97	0.41	0.10	0.08	1.51	1.20	4.98	0.83	8.08	26.35	5.84	32.19
50	6.48	3.11	0.44	0.10	0.08	1.51	1.20	5.28	0.88	8.57	27.64	6.19	33.83

Table VOC HCV 25 Economic Cost of Operation of HCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.84	2.16	0.21	0.10	0.02	1.74	1.38	3.35	0.56	5.43	20.79	3.93	24.72
5	5.78	2.23	0.23	0.10	0.02	1.74	1.38	3.48	0.58	5.65	21.20	4.08	25.29
10	5.75	2.31	0.25	0.10	0.03	1.74	1.38	3.62	0.61	5.88	21.67	4.25	25.93
15	5.74	2.39	0.28	0.10	0.04	1.74	1.38	3.78	0.63	6.14	22.21	4.43	26.65
20	5.76	2.48	0.30	0.10	0.04	1.74	1.38	3.95	0.66	6.41	22.83	4.63	27.46
25	5.81	2.58	0.32	0.10	0.05	1.74	1.38	4.14	0.69	6.71	23.52	4.85	28.37
30	5.90	2.68	0.35	0.10	0.06	1.74	1.38	4.34	0.73	7.04	24.32	5.09	29.41
35	6.04	2.79	0.37	0.10	0.06	1.74	1.38	4.56	0.76	7.41	25.22	5.35	30.57
40	6.22	2.91	0.39	0.10	0.07	1.74	1.38	4.81	0.81	7.81	26.25	5.65	31.90
45	6.47	3.04	0.42	0.10	0.08	1.74	1.38	5.09	0.85	8.27	27.44	5.97	33.41
50	6.79	3.19	0.44	0.10	0.08	1.74	1.38	5.41	0.91	8.77	28.81	6.34	35.15

Table VOC HCV 26 Economic Cost of Operation of HCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.54	2.68	0.20	0.09	0.02	1.55	1.23	3.33	0.56	5.40	20.59	3.90	24.49
5	5.47	2.79	0.23	0.09	0.02	1.55	1.23	3.46	0.58	5.61	21.04	4.06	25.09
10	5.44	2.91	0.25	0.09	0.03	1.55	1.23	3.60	0.60	5.84	21.54	4.22	25.77
15	5.42	3.05	0.27	0.09	0.04	1.55	1.23	3.75	0.63	6.09	22.12	4.40	26.52
20	5.44	3.19	0.30	0.09	0.04	1.55	1.23	3.92	0.66	6.36	22.78	4.60	27.38
25	5.49	3.35	0.32	0.09	0.05	1.55	1.23	4.10	0.69	6.66	23.52	4.81	28.34
30	5.57	3.52	0.34	0.09	0.06	1.55	1.23	4.30	0.72	6.98	24.37	5.05	29.42
35	5.70	3.72	0.37	0.09	0.06	1.55	1.23	4.53	0.76	7.34	25.34	5.31	30.65
40	5.87	3.94	0.39	0.09	0.07	1.55	1.23	4.77	0.80	7.74	26.45	5.60	32.05
45	6.11	4.18	0.41	0.09	0.08	1.55	1.23	5.04	0.84	8.19	27.73	5.92	33.64
50	6.41	4.46	0.44	0.09	0.08	1.55	1.23	5.35	0.90	8.68	29.20	6.28	35.47

Table VOC HCV 27 Economic Cost of Operation of HCV on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.68	2.74	0.21	0.10	0.02	1.78	1.41	3.38	0.57	5.48	21.37	3.96	25.33
5	5.63	2.86	0.23	0.10	0.02	1.78	1.41	3.51	0.59	5.70	21.84	4.12	25.96
10	5.60	2.98	0.25	0.10	0.03	1.78	1.41	3.66	0.61	5.94	22.38	4.29	26.67
15	5.60	3.12	0.28	0.10	0.04	1.78	1.41	3.82	0.64	6.20	22.98	4.48	27.46
20	5.63	3.28	0.30	0.10	0.04	1.78	1.41	3.99	0.67	6.48	23.68	4.68	28.36
25	5.69	3.44	0.32	0.10	0.05	1.78	1.41	4.18	0.70	6.78	24.47	4.90	29.37
30	5.79	3.63	0.35	0.10	0.06	1.78	1.41	4.39	0.74	7.12	25.36	5.15	30.51
35	5.93	3.84	0.37	0.10	0.06	1.78	1.41	4.62	0.77	7.50	26.39	5.42	31.81
40	6.13	4.07	0.40	0.10	0.07	1.78	1.41	4.88	0.82	7.91	27.57	5.72	33.28
45	6.39	4.33	0.42	0.10	0.08	1.78	1.41	5.16	0.86	8.38	28.92	6.05	34.97
50	6.73	4.63	0.44	0.10	0.08	1.78	1.41	5.48	0.92	8.90	30.48	6.43	36.91

Table VOC HCV 28 Economic Cost of Operation of HCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	, ,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.83	2.80	0.21	0.10	0.02	2.06	1.63	3.43	0.57	5.57	22.22	4.02	26.25
5	5.79	2.93	0.24	0.10	0.02	2.06	1.63	3.57	0.60	5.79	22.72	4.19	26.91
10	5.77	3.06	0.26	0.10	0.03	2.06	1.63	3.72	0.62	6.04	23.28	4.36	27.65
15	5.78	3.21	0.28	0.10	0.04	2.06	1.63	3.88	0.65	6.30	23.93	4.56	28.48
20	5.82	3.37	0.31	0.10	0.04	2.06	1.63	4.06	0.68	6.60	24.66	4.77	29.43
25	5.90	3.54	0.33	0.10	0.05	2.06	1.63	4.26	0.71	6.91	25.49	5.00	30.49
30	6.01	3.74	0.35	0.10	0.06	2.06	1.63	4.48	0.75	7.27	26.44	5.25	31.69
35	6.18	3.96	0.38	0.10	0.06	2.06	1.63	4.72	0.79	7.66	27.53	5.53	33.06
40	6.40	4.21	0.40	0.10	0.07	2.06	1.63	4.98	0.84	8.09	28.77	5.85	34.62
45	6.69	4.49	0.42	0.10	0.08	2.06	1.63	5.28	0.89	8.58	30.21	6.20	36.41
50	7.07	4.81	0.45	0.10	0.08	2.06	1.63	5.62	0.94	9.12	31.88	6.59	38.47

Table VOC HCV 29 Economic Cost of Operation of HCV on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.55	2.09	0.20	0.09	0.02	1.31	1.04	3.25	0.54	5.28	19.37	3.81	23.19
5	5.48	2.15	0.22	0.09	0.02	1.31	1.04	3.38	0.57	5.48	19.74	3.96	23.70
10	5.42	2.23	0.25	0.09	0.03	1.31	1.04	3.51	0.59	5.70	20.17	4.12	24.28
15	5.40	2.30	0.27	0.09	0.04	1.31	1.04	3.66	0.61	5.93	20.65	4.29	24.94
20	5.39	2.38	0.29	0.09	0.04	1.31	1.04	3.81	0.64	6.19	21.20	4.47	25.68
25	5.42	2.47	0.32	0.09	0.05	1.31	1.04	3.99	0.67	6.47	21.83	4.68	26.51
30	5.48	2.57	0.34	0.09	0.06	1.31	1.04	4.18	0.70	6.78	22.54	4.90	27.44
35	5.58	2.67	0.36	0.09	0.06	1.31	1.04	4.38	0.73	7.12	23.36	5.14	28.50
40	5.73	2.78	0.39	0.09	0.07	1.31	1.04	4.61	0.77	7.49	24.28	5.41	29.69
45	5.92	2.90	0.41	0.09	0.08	1.31	1.04	4.87	0.82	7.90	25.34	5.71	31.05
50	6.18	3.03	0.43	0.09	0.08	1.31	1.04	5.16	0.86	8.37	26.56	6.05	32.61

Table VOC HCV 30 Economic Cost of Operation of HCV on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.69	2.12	0.20	0.10	0.02	1.51	1.20	3.30	0.55	5.35	20.05	3.87	23.92
5	5.63	2.19	0.23	0.10	0.02	1.51	1.20	3.43	0.57	5.56	20.44	4.02	24.46
10	5.58	2.27	0.25	0.10	0.03	1.51	1.20	3.57	0.60	5.79	20.89	4.18	25.07
15	5.56	2.35	0.27	0.10	0.04	1.51	1.20	3.72	0.62	6.03	21.40	4.36	25.76
20	5.57	2.43	0.30	0.10	0.04	1.51	1.20	3.88	0.65	6.30	21.98	4.55	26.53
25	5.61	2.52	0.32	0.10	0.05	1.51	1.20	4.06	0.68	6.59	22.64	4.76	27.40
30	5.69	2.62	0.34	0.10	0.06	1.51	1.20	4.26	0.71	6.91	23.39	4.99	28.39
35	5.81	2.73	0.37	0.10	0.06	1.51	1.20	4.47	0.75	7.26	24.25	5.25	29.50
40	5.97	2.84	0.39	0.10	0.07	1.51	1.20	4.71	0.79	7.65	25.23	5.53	30.76
45	6.19	2.97	0.41	0.10	0.08	1.51	1.20	4.98	0.83	8.08	26.35	5.84	32.19
50	6.48	3.11	0.44	0.10	0.08	1.51	1.20	5.28	0.88	8.57	27.64	6.19	33.83

Table VOC HCV 31 Economic Cost of Operation of HCV on Six Lane Divided Expressways (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.84	2.16	0.21	0.10	0.02	1.74	1.38	3.35	0.56	5.43	20.79	3.93	24.72
5	5.78	2.23	0.23	0.10	0.02	1.74	1.38	3.48	0.58	5.65	21.20	4.08	25.29
10	5.75	2.31	0.25	0.10	0.03	1.74	1.38	3.62	0.61	5.88	21.67	4.25	25.93
15	5.74	2.39	0.28	0.10	0.04	1.74	1.38	3.78	0.63	6.14	22.21	4.43	26.65
20	5.76	2.48	0.30	0.10	0.04	1.74	1.38	3.95	0.66	6.41	22.83	4.63	27.46
25	5.81	2.58	0.32	0.10	0.05	1.74	1.38	4.14	0.69	6.71	23.52	4.85	28.37
30	5.90	2.68	0.35	0.10	0.06	1.74	1.38	4.34	0.73	7.04	24.32	5.09	29.41
35	6.04	2.79	0.37	0.10	0.06	1.74	1.38	4.57	0.76	7.41	25.22	5.35	30.57
40	6.22	2.91	0.39	0.10	0.07	1.74	1.38	4.81	0.81	7.81	26.25	5.65	31.90
45	6.47	3.04	0.42	0.10	0.08	1.74	1.38	5.09	0.85	8.27	27.44	5.97	33.41
50	6.79	3.19	0.44	0.10	0.08	1.74	1.38	5.41	0.91	8.77	28.81	6.34	35.15

Table VOC HCV 32 Economic Cost of Operation of HCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.58	1.71	0.20	0.09	0.02	1.21	0.96	3.18	0.53	5.16	18.63	3.73	22.35
5	5.49	1.75	0.22	0.09	0.02	1.21	0.96	3.30	0.55	5.35	18.95	3.87	22.81
10	5.42	1.80	0.24	0.09	0.03	1.21	0.96	3.43	0.57	5.56	19.31	4.02	23.33
15	5.38	1.85	0.27	0.09	0.04	1.21	0.96	3.56	0.60	5.78	19.74	4.18	23.92
20	5.36	1.90	0.29	0.09	0.04	1.21	0.96	3.71	0.62	6.03	20.22	4.36	24.58
25	5.37	1.96	0.32	0.09	0.05	1.21	0.96	3.88	0.65	6.29	20.77	4.55	25.32
30	5.41	2.02	0.34	0.09	0.06	1.21	0.96	4.06	0.68	6.58	21.40	4.76	26.15
35	5.48	2.08	0.36	0.09	0.06	1.21	0.96	4.25	0.71	6.90	22.11	4.99	27.10
40	5.60	2.15	0.39	0.09	0.07	1.21	0.96	4.47	0.75	7.25	22.93	5.24	28.17
45	5.76	2.22	0.41	0.09	0.08	1.21	0.96	4.71	0.79	7.64	23.86	5.52	29.38
50	5.98	2.29	0.43	0.09	0.08	1.21	0.96	4.97	0.83	8.07	24.92	5.83	30.76

Table VOC HCV 33
Economic Cost of Operation of HCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.71	1.73	0.20	0.10	0.02	1.39	1.10	3.22	0.54	5.23	19.25	3.78	23.03
5	5.63	1.78	0.22	0.10	0.02	1.39	1.10	3.35	0.56	5.43	19.59	3.93	23.51
10	5.58	1.83	0.25	0.10	0.03	1.39	1.10	3.48	0.58	5.65	19.98	4.08	24.06
15	5.54	1.88	0.27	0.10	0.04	1.39	1.10	3.62	0.61	5.88	20.42	4.25	24.67
20	5.53	1.93	0.29	0.10	0.04	1.39	1.10	3.78	0.63	6.13	20.93	4.43	25.36
25	5.55	1.99	0.32	0.10	0.05	1.39	1.10	3.95	0.66	6.41	21.51	4.63	26.14
30	5.60	2.05	0.34	0.10	0.06	1.39	1.10	4.13	0.69	6.71	22.17	4.85	27.02
35	5.70	2.12	0.36	0.10	0.06	1.39	1.10	4.34	0.73	7.04	22.93	5.09	28.01
40	5.83	2.19	0.39	0.10	0.07	1.39	1.10	4.56	0.76	7.40	23.79	5.35	29.14
45	6.01	2.26	0.41	0.10	0.08	1.39	1.10	4.81	0.81	7.81	24.77	5.64	30.41
50	6.26	2.34	0.43	0.10	0.08	1.39	1.10	5.09	0.85	8.26	25.90	5.97	31.87

Table VOC HCV 34
Economic Cost of Operation of HCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	5.85	1.76	0.20	0.10	0.02	1.60	1.27	3.27	0.55	5.31	19.93	3.84	23.77
5	5.78	1.81	0.23	0.10	0.02	1.60	1.27	3.40	0.57	5.51	20.29	3.99	24.28
10	5.73	1.86	0.25	0.10	0.03	1.60	1.27	3.53	0.59	5.74	20.70	4.15	24.85
15	5.71	1.91	0.27	0.10	0.04	1.60	1.27	3.68	0.62	5.98	21.17	4.32	25.49
20	5.71	1.96	0.30	0.10	0.04	1.60	1.27	3.84	0.64	6.24	21.71	4.51	26.22
25	5.74	2.02	0.32	0.10	0.05	1.60	1.27	4.02	0.67	6.52	22.32	4.71	27.03
30	5.81	2.09	0.34	0.10	0.06	1.60	1.27	4.21	0.71	6.83	23.02	4.94	27.96
35	5.92	2.15	0.37	0.10	0.06	1.60	1.27	4.42	0.74	7.18	23.81	5.19	29.00
40	6.07	2.23	0.39	0.10	0.07	1.60	1.27	4.66	0.78	7.56	24.72	5.46	30.18
45	6.28	2.30	0.41	0.10	0.08	1.60	1.27	4.92	0.82	7.98	25.76	5.77	31.52
50	6.55	2.38	0.44	0.10	0.08	1.60	1.27	5.21	0.87	8.45	26.95	6.11	33.06

Table VOC HCV 35 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.67	5.24	0.43	0.19	0.04	4.27	3.38	5.31	1.29	7.53	42.36	0.92	43.27
5	14.93	5.54	0.48	0.19	0.05	4.27	3.38	5.50	1.34	7.81	43.50	0.95	44.45
10	15.26	5.88	0.53	0.19	0.06	4.27	3.38	5.71	1.39	8.10	44.77	0.99	45.76
15	15.66	6.26	0.58	0.19	0.08	4.27	3.38	5.93	1.44	8.42	46.21	1.03	47.24
20	16.14	6.69	0.62	0.19	0.09	4.27	3.38	6.17	1.50	8.76	47.83	1.07	48.90
25	16.72	7.19	0.67	0.19	0.10	4.27	3.38	6.43	1.56	9.13	49.67	1.11	50.78
30	17.41	7.77	0.72	0.19	0.12	4.27	3.38	6.72	1.63	9.54	51.75	1.16	52.92
35	18.23	8.45	0.77	0.19	0.13	4.27	3.38	7.03	1.71	9.98	54.14	1.22	55.36
40	19.20	9.26	0.82	0.19	0.15	4.27	3.38	7.37	1.79	10.46	56.90	1.28	58.18
45	20.37	10.24	0.86	0.19	0.16	4.27	3.38	7.75	1.88	11.00	60.11	1.34	61.45
50	21.77	11.45	0.91	0.19	0.17	4.27	3.38	8.17	1.98	11.59	63.90	1.41	65.31

Table VOC HCV 36 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.18	5.40	0.45	0.20	0.04	4.92	3.90	5.38	1.31	7.64	44.42	0.93	45.35
5	15.47	5.72	0.50	0.20	0.05	4.92	3.90	5.58	1.36	7.92	45.62	0.97	46.58
10	15.82	6.08	0.55	0.20	0.06	4.92	3.90	5.79	1.41	8.22	46.96	1.00	47.97
15	16.26	6.49	0.59	0.20	0.08	4.92	3.90	6.02	1.46	8.55	48.48	1.04	49.52
20	16.77	6.96	0.64	0.20	0.09	4.92	3.90	6.27	1.52	8.90	50.19	1.09	51.27
25	17.39	7.50	0.69	0.20	0.10	4.92	3.90	6.54	1.59	9.29	52.13	1.13	53.26
30	18.13	8.13	0.74	0.20	0.12	4.92	3.90	6.84	1.66	9.71	54.35	1.18	55.53
35	19.01	8.88	0.79	0.20	0.13	4.92	3.90	7.16	1.74	10.17	56.90	1.24	58.13
40	20.06	9.77	0.83	0.20	0.15	4.92	3.90	7.52	1.83	10.67	59.85	1.30	61.15
45	21.31	10.87	0.88	0.20	0.16	4.92	3.90	7.91	1.92	11.23	63.31	1.37	64.67
50	22.82	12.25	0.93	0.20	0.17	4.92	3.90	8.35	2.03	11.85	67.41	1.44	68.86

Table VOC HCV 37 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.70	5.58	0.47	0.21	0.04	5.67	4.49	5.46	1.33	7.75	46.68	0.94	47.63
5	16.01	5.92	0.52	0.21	0.05	5.67	4.49	5.66	1.38	8.04	47.94	0.98	48.92
10	16.40	6.30	0.56	0.21	0.06	5.67	4.49	5.88	1.43	8.35	49.36	1.02	50.38
15	16.86	6.74	0.61	0.21	0.08	5.67	4.49	6.12	1.49	8.69	50.96	1.06	52.02
20	17.42	7.25	0.66	0.21	0.09	5.67	4.49	6.38	1.55	9.05	52.77	1.10	53.87
25	18.09	7.84	0.71	0.21	0.10	5.67	4.49	6.66	1.62	9.45	54.83	1.15	55.98
30	18.88	8.53	0.76	0.21	0.12	5.67	4.49	6.97	1.69	9.89	57.19	1.20	58.39
35	19.82	9.35	0.80	0.21	0.13	5.67	4.49	7.30	1.77	10.36	59.91	1.26	61.17
40	20.94	10.35	0.85	0.21	0.15	5.67	4.49	7.67	1.86	10.89	63.08	1.33	64.41
45	22.29	11.59	0.90	0.21	0.16	5.67	4.49	8.08	1.96	11.47	66.82	1.40	68.22
50	23.92	13.17	0.95	0.21	0.17	5.67	4.49	8.53	2.07	12.11	71.30	1.48	72.78

Table VOC HCV 38 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	16.23	5.76	0.49	0.22	0.04	6.53	5.17	5.54	1.35	7.86	49.18	0.96	50.14
5	16.57	6.13	0.53	0.22	0.05	6.53	5.17	5.75	1.40	8.16	50.51	0.99	51.50
10	16.99	6.54	0.58	0.22	0.06	6.53	5.17	5.98	1.45	8.48	52.00	1.03	53.03
15	17.49	7.01	0.63	0.22	0.08	6.53	5.17	6.22	1.51	8.83	53.69	1.08	54.77
20	18.08	7.56	0.68	0.22	0.09	6.53	5.17	6.49	1.58	9.21	55.61	1.12	56.73
25	18.80	8.20	0.73	0.22	0.10	6.53	5.17	6.78	1.65	9.62	57.79	1.17	58.97
30	19.65	8.96	0.77	0.22	0.12	6.53	5.17	7.10	1.72	10.07	60.31	1.23	61.54
35	20.66	9.88	0.82	0.22	0.13	6.53	5.17	7.44	1.81	10.57	63.23	1.29	64.51
40	21.86	11.00	0.87	0.22	0.15	6.53	5.17	7.83	1.90	11.11	66.64	1.35	68.00
45	23.32	12.42	0.92	0.22	0.16	6.53	5.17	8.26	2.01	11.72	70.70	1.43	72.13
50	25.07	14.24	0.97	0.22	0.17	6.53	5.17	8.73	2.12	12.39	75.62	1.51	77.13

Table VOC HCV 39 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	16.77	5.96	0.50	0.23	0.04	7.52	5.95	5.62	1.37	7.98	51.94	0.97	52.91
5	17.14	6.35	0.55	0.23	0.05	7.52	5.95	5.84	1.42	8.29	53.33	1.01	54.34
10	17.59	6.79	0.60	0.23	0.06	7.52	5.95	6.07	1.48	8.62	54.91	1.05	55.96
15	18.13	7.31	0.65	0.23	0.08	7.52	5.95	6.33	1.54	8.98	56.70	1.09	57.79
20	18.77	7.90	0.70	0.23	0.09	7.52	5.95	6.60	1.60	9.37	58.73	1.14	59.87
25	19.53	8.61	0.74	0.23	0.10	7.52	5.95	6.90	1.68	9.80	61.06	1.19	62.26
30	20.44	9.45	0.79	0.23	0.12	7.52	5.95	7.23	1.76	10.26	63.75	1.25	65.00
35	21.52	10.47	0.84	0.23	0.13	7.52	5.95	7.59	1.85	10.78	66.88	1.31	68.20
40	22.82	11.74	0.89	0.23	0.15	7.52	5.95	7.99	1.94	11.35	70.58	1.38	71.97
45	24.39	13.36	0.94	0.23	0.16	7.52	5.95	8.44	2.05	11.98	75.02	1.46	76.48
50	26.29	15.51	0.98	0.23	0.17	7.52	5.95	8.94	2.17	12.68	80.45	1.55	82.00

Table VOC HCV 40 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	17.32	6.17	0.52	0.24	0.04	8.66	6.85	5.71	1.39	8.10	54.99	0.99	55.98
5	17.72	6.59	0.57	0.24	0.05	8.66	6.85	5.93	1.44	8.42	56.47	1.03	57.49
10	18.20	7.07	0.62	0.24	0.06	8.66	6.85	6.17	1.50	8.76	58.14	1.07	59.20
15	18.78	7.62	0.67	0.24	0.08	8.66	6.85	6.43	1.56	9.13	60.03	1.11	61.14
20	19.47	8.28	0.71	0.24	0.09	8.66	6.85	6.72	1.63	9.54	62.19	1.16	63.35
25	20.29	9.05	0.76	0.24	0.10	8.66	6.85	7.03	1.71	9.98	64.68	1.22	65.89
30	21.26	9.99	0.81	0.24	0.12	8.66	6.85	7.37	1.79	10.46	67.56	1.28	68.83
35	22.43	11.14	0.86	0.24	0.13	8.66	6.85	7.75	1.88	11.00	70.94	1.34	72.28
40	23.83	12.58	0.91	0.24	0.15	8.66	6.85	8.17	1.98	11.59	74.96	1.41	76.37
45	25.52	14.47	0.95	0.24	0.16	8.66	6.85	8.63	2.10	12.25	79.83	1.49	81.32
50	27.58	17.01	1.00	0.24	0.17	8.66	6.85	9.15	2.22	12.99	85.89	1.58	87.47

Table VOC HCV 41 Financial Cost of Operation of HCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	17.88	6.39	0.54	0.24	0.04	9.98	7.90	5.79	1.41	8.22	58.40	1.00	59.40
5	18.32	6.84	0.59	0.24	0.05	9.98	7.90	6.02	1.46	8.55	59.95	1.04	61.00
10	18.83	7.36	0.64	0.24	0.06	9.98	7.90	6.27	1.52	8.90	61.72	1.09	62.80
15	19.45	7.97	0.69	0.24	0.08	9.98	7.90	6.54	1.59	9.29	63.73	1.13	64.86
20	20.19	8.69	0.73	0.24	0.09	9.98	7.90	6.84	1.66	9.71	66.03	1.18	67.21
25	21.07	9.54	0.78	0.24	0.10	9.98	7.90	7.16	1.74	10.17	68.69	1.24	69.93
30	22.11	10.59	0.83	0.24	0.12	9.98	7.90	7.52	1.83	10.67	71.79	1.30	73.09
35	23.37	11.89	0.88	0.24	0.13	9.98	7.90	7.91	1.92	11.23	75.45	1.37	76.81
40	24.87	13.56	0.92	0.24	0.15	9.98	7.90	8.35	2.03	11.85	79.84	1.44	81.29
45	26.70	15.77	0.97	0.24	0.16	9.98	7.90	8.83	2.15	12.54	85.24	1.53	86.77
50	28.95	18.84	1.02	0.24	0.17	9.98	7.90	9.38	2.28	13.31	92.07	1.62	93.69

Table VOC HCV 42 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.99	4.40	0.42	0.19	0.04	3.18	2.51	4.92	1.20	6.98	37.83	0.85	38.68
5	14.17	4.60	0.47	0.19	0.05	3.18	2.51	5.10	1.24	7.24	38.76	0.88	39.65
10	14.41	4.83	0.52	0.19	0.06	3.18	2.51	5.30	1.29	7.52	39.81	0.92	40.73
15	14.71	5.09	0.56	0.19	0.08	3.18	2.51	5.51	1.34	7.82	41.00	0.95	41.95
20	15.09	5.37	0.61	0.19	0.09	3.18	2.51	5.74	1.39	8.15	42.33	0.99	43.33
25	15.56	5.69	0.66	0.19	0.11	3.18	2.51	5.99	1.46	8.50	43.85	1.04	44.88
30	16.13	6.04	0.71	0.19	0.12	3.18	2.51	6.26	1.52	8.89	45.56	1.08	46.64
35	16.83	6.45	0.76	0.19	0.13	3.18	2.51	6.56	1.59	9.31	47.51	1.13	48.65
40	17.67	6.91	0.80	0.19	0.15	3.18	2.51	6.89	1.67	9.78	49.75	1.19	50.94
45	18.68	7.44	0.85	0.19	0.16	3.18	2.51	7.25	1.76	10.29	52.32	1.25	53.57
50	19.91	8.06	0.90	0.19	0.17	3.18	2.51	7.65	1.86	10.86	55.30	1.32	56.63

Table VOC HCV 43 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.47	4.51	0.43	0.20	0.04	3.66	2.90	4.99	1.21	7.08	39.49	0.86	40.36
5	14.67	4.73	0.48	0.20	0.05	3.66	2.90	5.18	1.26	7.35	40.47	0.90	41.37
10	14.93	4.97	0.53	0.20	0.06	3.66	2.90	5.38	1.31	7.64	41.58	0.93	42.51
15	15.26	5.24	0.58	0.20	0.08	3.66	2.90	5.60	1.36	7.95	42.82	0.97	43.79
20	15.68	5.54	0.62	0.20	0.09	3.66	2.90	5.84	1.42	8.29	44.23	1.01	45.24
25	16.19	5.88	0.67	0.20	0.11	3.66	2.90	6.10	1.48	8.65	45.83	1.05	46.88
30	16.81	6.26	0.72	0.20	0.12	3.66	2.90	6.38	1.55	9.05	47.64	1.10	48.74
35	17.56	6.69	0.77	0.20	0.13	3.66	2.90	6.69	1.62	9.49	49.71	1.16	50.86
40	18.46	7.19	0.82	0.20	0.15	3.66	2.90	7.03	1.71	9.98	52.08	1.22	53.30
45	19.55	7.77	0.86	0.20	0.16	3.66	2.90	7.41	1.80	10.51	54.82	1.28	56.10
50	20.88	8.44	0.91	0.20	0.17	3.66	2.90	7.83	1.90	11.11	58.01	1.35	59.36

Table VOC HCV 44 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	The second second	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.95	4.63	0.44	0.21	0.04	4.22	3.34	5.06	1.23	7.19	41.31	0.88	42.18
5	15.18	4.86	0.49	0.21	0.05	4.22	3.34	5.26	1.28	7.46	42.34	0.91	43.25
10	15.47	5.12	0.54	0.21	0.06	4.22	3.34	5.47	1.33	7.76	43.50	0.95	44.45
15	15.83	5.40	0.59	0.21	0.08	4.22	3.34	5.69	1.38	8.08	44.81	0.98	45.80
20	16.28	5.72	0.64	0.21	0.09	4.22	3.34	5.94	1.44	8.43	46.30	1.03	47.33
25	16.83	6.08	0.68	0.21	0.11	4.22	3.34	6.20	1.51	8.81	47.98	1.07	49.06
30	17.50	6.49	0.73	0.21	0.12	4.22	3.34	6.50	1.58	9.22	49.90	1.12	51.02
35	18.31	6.96	0.78	0.21	0.13	4.22	3.34	6.82	1.66	9.68	52.09	1.18	53.27
40	19.28	7.50	0.83	0.21	0.15	4.22	3.34	7.17	1.74	10.18	54.61	1.24	55.85
45	20.46	8.13	0.88	0.21	0.16	4.22	3.34	7.57	1.84	10.74	57.53	1.31	58.84
50	21.90	8.87	0.92	0.21	0.17	4.22	3.34	8.01	1.95	11.37	60.95	1.38	62.33

Table VOC HCV 45 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.45	4.75	0.46	0.22	0.04	4.86	3.84	5.14	1.25	7.29	43.29	0.89	44.18
5	15.70	5.00	0.51	0.22	0.05	4.86	3.84	5.34	1.30	7.58	44.38	0.92	45.30
10	16.01	5.27	0.55	0.22	0.06	4.86	3.84	5.55	1.35	7.88	45.60	0.96	46.56
15	16.41	5.57	0.60	0.22	0.08	4.86	3.84	5.79	1.41	8.21	46.99	1.00	47.99
20	16.90	5.92	0.65	0.22	0.09	4.86	3.84	6.04	1.47	8.57	48.55	1.04	49.60
25	17.49	6.30	0.70	0.22	0.11	4.86	3.84	6.32	1.54	8.97	50.33	1.09	51.42
30	18.21	6.74	0.75	0.22	0.12	4.86	3.84	6.62	1.61	9.40	52.36	1.15	53.51
35	19.08	7.25	0.79	0.22	0.13	4.86	3.84	6.96	1.69	9.87	54.69	1.20	55.89
40	20.14	7.83	0.84	0.22	0.15	4.86	3.84	7.32	1.78	10.40	57.37	1.27	58.64
45	21.41	8.52	0.89	0.22	0.16	4.86	3.84	7.74	1.88	10.98	60.49	1.34	61.83
50	22.97	9.35	0.94	0.22	0.17	4.86	3.84	8.20	1.99	11.63	64.16	1.42	65.58

Table VOC HCV 46 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.95	4.89	0.47	0.23	0.04	5.59	4.43	5.22	1.27	7.40	45.47	0.90	46.38
5	16.22	5.15	0.52	0.23	0.05	5.59	4.43	5.42	1.32	7.70	46.62	0.94	47.55
10	16.57	5.43	0.57	0.23	0.06	5.59	4.43	5.64	1.37	8.01	47.91	0.98	48.88
15	17.00	5.76	0.61	0.23	0.08	5.59	4.43	5.88	1.43	8.35	49.37	1.02	50.38
20	17.53	6.12	0.66	0.23	0.09	5.59	4.43	6.15	1.49	8.73	51.02	1.06	52.08
25	18.17	6.54	0.71	0.23	0.11	5.59	4.43	6.43	1.56	9.13	52.90	1.11	54.01
30	18.95	7.01	0.76	0.23	0.12	5.59	4.43	6.75	1.64	9.58	55.05	1.17	56.22
35	19.89	7.56	0.81	0.23	0.13	5.59	4.43	7.10	1.72	10.07	57.53	1.23	58.75
40	21.02	8.20	0.85	0.23	0.15	5.59	4.43	7.48	1.82	10.62	60.39	1.29	61.68
45	22.40	8.96	0.90	0.23	0.16	5.59	4.43	7.91	1.92	11.23	63.73	1.37	65.10
50	24.09	9.87	0.95	0.23	0.17	5.59	4.43	8.39	2.04	11.91	67.68	1.45	69.13

Table VOC HCV 47
Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	16.46	5.03	0.48	0.24	0.04	6.44	5.10	5.30	1.29	7.52	47.88	0.92	48.80
5	16.77	5.30	0.53	0.24	0.05	6.44	5.10	5.51	1.34	7.82	49.08	0.95	50.04
10	17.14	5.61	0.58	0.24	0.06	6.44	5.10	5.74	1.39	8.14	50.44	0.99	51.44
15	17.61	5.95	0.63	0.24	0.08	6.44	5.10	5.99	1.45	8.50	51.98	1.04	53.02
20	18.18	6.34	0.67	0.24	0.09	6.44	5.10	6.26	1.52	8.88	53.73	1.08	54.81
25	18.88	6.79	0.72	0.24	0.11	6.44	5.10	6.56	1.59	9.31	55.72	1.13	56.86
30	19.71	7.30	0.77	0.24	0.12	6.44	5.10	6.88	1.67	9.77	58.01	1.19	59.20
35	20.73	7.90	0.82	0.24	0.13	6.44	5.10	7.25	1.76	10.28	60.64	1.25	61.89
40	21.95	8.60	0.87	0.24	0.15	6.44	5.10	7.65	1.86	10.85	63.70	1.32	65.02
45	23.44	9.44	0.91	0.24	0.16	6.44	5.10	8.10	1.97	11.49	67.29	1.40	68.69
50	25.28	10.46	0.96	0.24	0.17	6.44	5.10	8.60	2.09	12.21	71.55	1.49	73.04

Table VOC HCV 48 Financial Cost of Operation of HCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	3	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	16.99	5.17	0.49	0.24	0.04	7.42	5.87	5.38	1.31	7.63	50.54	0.93	51.47
5	17.32	5.47	0.54	0.24	0.05	7.42	5.87	5.60	1.36	7.94	51.81	0.97	52.78
10	17.73	5.79	0.59	0.24	0.06	7.42	5.87	5.83	1.42	8.28	53.25	1.01	54.25
15	18.24	6.16	0.64	0.24	0.08	7.42	5.87	6.09	1.48	8.65	54.87	1.05	55.92
20	18.86	6.58	0.69	0.24	0.09	7.42	5.87	6.37	1.55	9.05	56.72	1.10	57.82
25	19.60	7.06	0.73	0.24	0.11	7.42	5.87	6.68	1.62	9.48	58.83	1.16	59.99
30	20.50	7.62	0.78	0.24	0.12	7.42	5.87	7.02	1.71	9.97	61.26	1.21	62.47
35	21.60	8.27	0.83	0.24	0.13	7.42	5.87	7.40	1.80	10.50	64.07	1.28	65.35
40	22.92	9.05	0.88	0.24	0.15	7.42	5.87	7.82	1.90	11.10	67.34	1.35	68.70
45	24.54	9.98	0.93	0.24	0.16	7.42	5.87	8.29	2.01	11.77	71.21	1.43	72.64
50	26.53	11.13	0.97	0.24	0.17	7.42	5.87	8.82	2.14	12.52	75.83	1.53	77.35

Table VOC HCV 49 Financial Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.66	3.86	0.41	0.19	0.04	2.77	2.19	4.68	1.14	6.64	35.59	0.97	36.56
5	13.77	4.02	0.46	0.19	0.05	2.77	2.19	4.86	1.18	6.89	36.40	1.01	37.40
10	13.95	4.19	0.51	0.19	0.06	2.77	2.19	5.05	1.23	7.16	37.31	1.04	38.36
15	14.19	4.39	0.56	0.19	0.08	2.77	2.19	5.25	1.28	7.45	38.35	1.09	39.44
20	14.51	4.59	0.61	0.19	0.09	2.77	2.19	5.47	1.33	7.77	39.52	1.13	40.66
25	14.91	4.82	0.65	0.19	0.11	2.77	2.19	5.71	1.39	8.11	40.86	1.18	42.04
30	15.41	5.08	0.70	0.19	0.12	2.77	2.19	5.98	1.45	8.48	42.38	1.24	43.61
35	16.02	5.36	0.75	0.19	0.13	2.77	2.19	6.27	1.52	8.89	44.10	1.30	45.40
40	16.78	5.67	0.80	0.19	0.15	2.77	2.19	6.59	1.60	9.35	46.08	1.36	47.45
45	17.70	6.02	0.85	0.19	0.16	2.77	2.19	6.94	1.69	9.85	48.36	1.44	49.79
50	18.82	6.42	0.89	0.19	0.17	2.77	2.19	7.33	1.78	10.41	50.99	1.52	52.51

Table VOC HCV 50 Financial Cost of Operation of HCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.11	3.95	0.42	0.20	0.04	3.19	2.53	4.75	1.15	6.74	37.08	0.98	38.07
5	14.25	4.11	0.47	0.20	0.05	3.19	2.53	4.93	1.20	7.00	37.93	1.02	38.95
10	14.45	4.30	0.52	0.20	0.06	3.19	2.53	5.12	1.25	7.27	38.90	1.06	39.96
15	14.72	4.50	0.57	0.20	0.08	3.19	2.53	5.34	1.30	7.57	39.99	1.10	41.09
20	15.07	4.72	0.62	0.20	0.09	3.19	2.53	5.57	1.35	7.90	41.23	1.15	42.38
25	15.50	4.96	0.66	0.20	0.11	3.19	2.53	5.82	1.41	8.25	42.64	1.20	43.84
30	16.05	5.23	0.71	0.20	0.12	3.19	2.53	6.09	1.48	8.64	44.24	1.26	45.50
35	16.72	5.53	0.76	0.20	0.13	3.19	2.53	6.39	1.55	9.07	46.07	1.32	47.39
40	17.53	5.86	0.81	0.20	0.15	3.19	2.53	6.72	1.63	9.54	48.16	1.39	49.55
45	18.53	6.24	0.86	0.20	0.16	3.19	2.53	7.09	1.72	10.06	50.58	1.47	52.04
50	19.74	6.67	0.90	0.20	0.17	3.19	2.53	7.50	1.82	10.64	53.38	1.55	54.93

Table VOC HCV 51 Financial Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.57	4.04	0.43	0.21	0.04	3.68	2.91	4.82	1.17	6.84	38.71	1.00	39.71
5	14.73	4.21	0.48	0.21	0.05	3.68	2.91	5.01	1.22	7.10	39.60	1.04	40.64
10	14.96	4.41	0.53	0.21	0.06	3.68	2.91	5.21	1.27	7.39	40.62	1.08	41.70
15	15.26	4.62	0.58	0.21	0.08	3.68	2.91	5.42	1.32	7.70	41.77	1.12	42.89
20	15.64	4.85	0.63	0.21	0.09	3.68	2.91	5.66	1.38	8.04	43.08	1.17	44.25
25	16.12	5.10	0.67	0.21	0.11	3.68	2.91	5.92	1.44	8.40	44.56	1.23	45.79
30	16.71	5.39	0.72	0.21	0.12	3.68	2.91	6.20	1.51	8.81	46.26	1.28	47.54
35	17.43	5.71	0.77	0.21	0.13	3.68	2.91	6.52	1.58	9.25	48.19	1.35	49.54
40	18.31	6.06	0.82	0.21	0.15	3.68	2.91	6.86	1.67	9.74	50.41	1.42	51.83
45	19.39	6.47	0.87	0.21	0.16	3.68	2.91	7.25	1.76	10.28	52.98	1.50	54.48
50	20.71	6.93	0.91	0.21	0.17	3.68	2.91	7.68	1.87	10.89	55.97	1.59	57.56

Table VOC HCV 52 Financial Cost of Operation of HCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.04	4.13	0.44	0.22	0.04	4.24	3.35	4.89	1.19	6.94	40.48	1.01	41.50
5	15.23	4.32	0.49	0.22	0.05	4.24	3.35	5.08	1.24	7.22	41.43	1.05	42.48
10	15.48	4.52	0.54	0.22	0.06	4.24	3.35	5.29	1.29	7.51	42.50	1.10	43.59
15	15.81	4.74	0.59	0.22	0.08	4.24	3.35	5.52	1.34	7.83	43.71	1.14	44.85
20	16.23	4.99	0.64	0.22	0.09	4.24	3.35	5.76	1.40	8.18	45.09	1.19	46.28
25	16.75	5.26	0.68	0.22	0.11	4.24	3.35	6.03	1.47	8.56	46.66	1.25	47.91
30	17.39	5.56	0.73	0.22	0.12	4.24	3.35	6.32	1.54	8.98	48.45	1.31	49.76
35	18.17	5.90	0.78	0.22	0.13	4.24	3.35	6.65	1.62	9.44	50.50	1.38	51.87
40	19.13	6.28	0.83	0.22	0.15	4.24	3.35	7.01	1.70	9.95	52.85	1.45	54.30
45	20.30	6.72	0.88	0.22	0.16	4.24	3.35	7.41	1.80	10.52	55.59	1.53	57.12
50	21.73	7.22	0.92	0.22	0.17	4.24	3.35	7.86	1.91	11.16	58.78	1.63	60.41

Table VOC HCV 53 Financial Cost of Operation of HCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.52	4.23	0.45	0.23	0.04	4.88	3.86	4.97	1.21	7.05	42.43	1.03	43.46
5	15.73	4.43	0.50	0.23	0.05	4.88	3.86	5.16	1.25	7.33	43.43	1.07	44.50
10	16.01	4.64	0.55	0.23	0.06	4.88	3.86	5.38	1.31	7.63	44.56	1.11	45.67
15	16.38	4.87	0.60	0.23	0.08	4.88	3.86	5.61	1.36	7.96	45.84	1.16	47.00
20	16.83	5.13	0.65	0.23	0.09	4.88	3.86	5.87	1.43	8.33	47.29	1.21	48.50
25	17.40	5.42	0.69	0.23	0.11	4.88	3.86	6.14	1.49	8.72	48.94	1.27	50.22
30	18.09	5.74	0.74	0.23	0.12	4.88	3.86	6.45	1.57	9.15	50.84	1.34	52.17
35	18.94	6.10	0.79	0.23	0.13	4.88	3.86	6.79	1.65	9.63	53.01	1.41	54.41
40	19.98	6.51	0.84	0.23	0.15	4.88	3.86	7.16	1.74	10.17	55.52	1.48	57.00
45	21.24	6.98	0.89	0.23	0.16	4.88	3.86	7.58	1.84	10.76	58.43	1.57	60.00
50	22.80	7.53	0.93	0.23	0.17	4.88	3.86	8.05	1.96	11.43	61.85	1.67	63.52

Table VOC HCV 54 Financial Cost of Operation of HCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.18	3.86	0.41	0.19	0.04	2.77	2.19	3.80	0.92	5.40	32.77	3.90	36.68
5	13.03	4.02	0.46	0.19	0.05	2.77	2.19	3.95	0.96	5.61	33.25	4.06	37.30
10	12.94	4.19	0.51	0.19	0.06	2.77	2.19	4.12	1.00	5.84	33.82	4.22	38.04
15	12.91	4.39	0.56	0.19	0.08	2.77	2.19	4.29	1.04	6.09	34.51	4.40	38.91
20	12.94	4.59	0.61	0.19	0.09	2.77	2.19	4.48	1.09	6.36	35.33	4.60	39.92
25	13.06	4.82	0.65	0.19	0.11	2.77	2.19	4.69	1.14	6.66	36.29	4.81	41.10
30	13.26	5.08	0.70	0.19	0.12	2.77	2.19	4.92	1.20	6.98	37.41	5.05	42.46
35	13.56	5.36	0.75	0.19	0.13	2.77	2.19	5.17	1.26	7.34	38.73	5.31	44.04
40	13.98	5.67	0.80	0.19	0.15	2.77	2.19	5.45	1.33	7.74	40.27	5.60	45.87
45	14.54	6.02	0.85	0.19	0.16	2.77	2.19	5.77	1.40	8.19	42.08	5.92	48.00
50	15.27	6.42	0.89	0.19	0.17	2.77	2.19	6.12	1.49	8.68	44.21	6.28	50.48

Table VOC HCV 59 Financial Cost of Operation of HCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.89	3.11	0.42	0.21	0.04	3.12	2.47	3.83	0.93	5.43	33.45	3.93	37.38
5	13.76	3.22	0.47	0.21	0.05	3.12	2.47	3.98	0.97	5.65	33.88	4.08	37.96
10	13.67	3.33	0.52	0.21	0.06	3.12	2.47	4.14	1.01	5.88	34.41	4.25	38.66
15	13.65	3.45	0.56	0.21	0.08	3.12	2.47	4.32	1.05	6.14	35.04	4.43	39.47
20	13.70	3.57	0.61	0.21	0.09	3.12	2.47	4.52	1.10	6.41	35.79	4.63	40.43
25	13.83	3.71	0.66	0.21	0.11	3.12	2.47	4.73	1.15	6.71	36.69	4.85	41.54
30	14.05	3.86	0.71	0.21	0.12	3.12	2.47	4.96	1.21	7.04	37.73	5.09	42.82
35	14.37	4.02	0.76	0.21	0.13	3.12	2.47	5.22	1.27	7.41	38.96	5.35	44.32
40	14.81	4.19	0.80	0.21	0.15	3.12	2.47	5.51	1.34	7.81	40.40	5.65	46.05
45	15.39	4.38	0.85	0.21	0.16	3.12	2.47	5.82	1.42	8.27	42.09	5.97	48.06
50	16.16	4.59	0.90	0.21	0.17	3.12	2.47	6.18	1.50	8.77	44.07	6.34	50.41

Table VOC HCV 60
Financial Cost of Operation of HCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.18	3.86	0.41	0.19	0.04	2.77	2.19	3.80	0.92	5.40	32.77	3.90	36.68
5	13.03	4.02	0.46	0.19	0.05	2.77	2.19	3.95	0.96	5.61	33.25	4.06	37.30
10	12.94	4.19	0.51	0.19	0.06	2.77	2.19	4.12	1.00	5.84	33.82	4.22	38.04
15	12.91	4.39	0.56	0.19	0.08	2.77	2.19	4.29	1.04	6.09	34.51	4.40	38.91
20	12.94	4.59	0.61	0.19	0.09	2.77	2.19	4.48	1.09	6.36	35.33	4.60	39.92
25	13.06	4.82	0.65	0.19	0.11	2.77	2.19	4.69	1.14	6.66	36.29	4.81	41.10
30	13.26	5.08	0.70	0.19	0.12	2.77	2.19	4.92	1.20	6.98	37.41	5.05	42.46
35	13.56	5.36	0.75	0.19	0.13	2.77	2.19	5.17	1.26	7.34	38.73	5.31	44.04
40	13.98	5.67	0.80	0.19	0.15	2.77	2.19	5.45	1.33	7.74	40.27	5.60	45.87
45	14.54	6.02	0.85	0.19	0.16	2.77	2.19	5.77	1.40	8.19	42.08	5.92	48.00
50	15.27	6.42	0.89	0.19	0.17	2.77	2.19	6.12	1.49	8.68	44.21	6.28	50.48

Table VOC HCV 61
Financial Cost of Operation of HCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.52	3.95	0.42	0.20	0.04	3.19	2.53	3.86	0.94	5.48	34.14	3.96	38.10
5	13.40	4.11	0.47	0.20	0.05	3.19	2.53	4.02	0.98	5.70	34.65	4.12	38.77
10	13.33	4.30	0.52	0.20	0.06	3.19	2.53	4.18	1.02	5.94	35.27	4.29	39.56
15	13.32	4.50	0.57	0.20	0.08	3.19	2.53	4.37	1.06	6.20	36.01	4.48	40.49
20	13.39	4.72	0.62	0.20	0.09	3.19	2.53	4.56	1.11	6.48	36.88	4.68	41.57
25	13.54	4.96	0.66	0.20	0.11	3.19	2.53	4.78	1.16	6.78	37.91	4.90	42.82
30	13.78	5.23	0.71	0.20	0.12	3.19	2.53	5.02	1.22	7.12	39.12	5.15	44.26
35	14.12	5.53	0.76	0.20	0.13	3.19	2.53	5.28	1.28	7.50	40.52	5.42	45.94
40	14.59	5.86	0.81	0.20	0.15	3.19	2.53	5.57	1.35	7.91	42.17	5.72	47.89
45	15.22	6.24	0.86	0.20	0.16	3.19	2.53	5.90	1.43	8.38	44.10	6.05	50.16
50	16.02	6.67	0.90	0.20	0.17	3.19	2.53	6.27	1.52	8.90	46.38	6.43	52.81

Table VOC HCV 62
Financial Cost of Operation of HCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.88	4.04	0.43	0.21	0.04	3.68	2.91	3.92	0.95	5.57	35.63	4.02	39.65
5	13.77	4.21	0.48	0.21	0.05	3.68	2.91	4.08	0.99	5.79	36.19	4.19	40.37
10	13.73	4.41	0.53	0.21	0.06	3.68	2.91	4.25	1.03	6.04	36.85	4.36	41.22
15	13.75	4.62	0.58	0.21	0.08	3.68	2.91	4.44	1.08	6.30	37.65	4.56	42.20
20	13.85	4.85	0.63	0.21	0.09	3.68	2.91	4.65	1.13	6.60	38.58	4.77	43.35
25	14.03	5.10	0.67	0.21	0.11	3.68	2.91	4.87	1.18	6.91	39.68	5.00	44.68
30	14.31	5.39	0.72	0.21	0.12	3.68	2.91	5.12	1.24	7.27	40.97	5.25	46.22
35	14.70	5.71	0.77	0.21	0.13	3.68	2.91	5.39	1.31	7.66	42.47	5.53	48.00
40	15.23	6.06	0.82	0.21	0.15	3.68	2.91	5.70	1.38	8.09	44.23	5.85	50.08
45	15.92	6.47	0.87	0.21	0.16	3.68	2.91	6.04	1.47	8.58	46.30	6.20	52.50
50	16.81	6.93	0.91	0.21	0.17	3.68	2.91	6.43	1.56	9.12	48.75	6.59	55.34

Table VOC HCV 63
Financial Cost of Operation of HCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.22	3.01	0.41	0.19	0.04	2.35	1.86	3.72	0.90	5.28	30.96	3.81	34.77
5	13.04	3.10	0.46	0.19	0.05	2.35	1.86	3.86	0.94	5.48	31.32	3.96	35.28
10	12.91	3.21	0.50	0.19	0.06	2.35	1.86	4.01	0.98	5.70	31.77	4.12	35.88
15	12.84	3.32	0.55	0.19	0.08	2.35	1.86	4.18	1.02	5.93	32.31	4.29	36.60
20	12.83	3.43	0.60	0.19	0.09	2.35	1.86	4.36	1.06	6.19	32.97	4.47	37.44
25	12.90	3.56	0.65	0.19	0.11	2.35	1.86	4.56	1.11	6.47	33.75	4.68	38.42
30	13.04	3.70	0.70	0.19	0.12	2.35	1.86	4.78	1.16	6.78	34.67	4.90	39.57
35	13.28	3.84	0.74	0.19	0.13	2.35	1.86	5.01	1.22	7.12	35.75	5.14	40.89
40	13.62	4.00	0.79	0.19	0.15	2.35	1.86	5.28	1.28	7.49	37.01	5.41	42.42
45	14.09	4.17	0.84	0.19	0.16	2.35	1.86	5.57	1.35	7.90	38.49	5.71	44.20
50	14.71	4.36	0.89	0.19	0.17	2.35	1.86	5.89	1.43	8.37	40.23	6.05	46.28

Table VOC HCV 64
Financial Cost of Operation of HCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.55	3.06	0.41	0.20	0.04	2.71	2.14	3.77	0.92	5.35	32.15	3.87	36.02
5	13.39	3.16	0.46	0.20	0.05	2.71	2.14	3.92	0.95	5.56	32.54	4.02	36.56
10	13.29	3.27	0.51	0.20	0.06	2.71	2.14	4.08	0.99	5.79	33.03	4.18	37.21
15	13.24	3.38	0.56	0.20	0.08	2.71	2.14	4.25	1.03	6.03	33.62	4.36	37.98
20	13.26	3.50	0.61	0.20	0.09	2.71	2.14	4.44	1.08	6.30	34.32	4.55	38.87
25	13.36	3.63	0.65	0.20	0.11	2.71	2.14	4.64	1.13	6.59	35.16	4.76	39.92
30	13.54	3.77	0.70	0.20	0.12	2.71	2.14	4.87	1.18	6.91	36.14	4.99	41.13
35	13.82	3.93	0.75	0.20	0.13	2.71	2.14	5.11	1.24	7.26	37.29	5.25	42.54
40	14.21	4.09	0.80	0.20	0.15	2.71	2.14	5.39	1.31	7.65	38.64	5.53	44.16
45	14.73	4.28	0.85	0.20	0.16	2.71	2.14	5.69	1.38	8.08	40.22	5.84	46.06
50	15.42	4.47	0.89	0.20	0.17	2.71	2.14	6.03	1.47	8.57	42.07	6.19	48.26

Table VOC HCV 65 Financial Cost of Operation of HCV on Six Lane Divided Expressways Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.89	3.11	0.42	0.21	0.04	3.12	2.47	3.83	0.93	5.43	33.45	3.93	37.38
5	13.76	3.22	0.47	0.21	0.05	3.12	2.47	3.98	0.97	5.65	33.88	4.08	37.96
10	13.67	3.33	0.52	0.21	0.06	3.12	2.47	4.14	1.01	5.88	34.41	4.25	38.66
15	13.65	3.45	0.56	0.21	0.08	3.12	2.47	4.32	1.05	6.14	35.04	4.43	39.47
20	13.70	3.57	0.61	0.21	0.09	3.12	2.47	4.52	1.10	6.41	35.79	4.63	40.43
25	13.83	3.71	0.66	0.21	0.11	3.12	2.47	4.73	1.15	6.71	36.69	4.85	41.54
30	14.05	3.86	0.71	0.21	0.12	3.12	2.47	4.96	1.21	7.04	37.73	5.09	42.82
35	14.37	4.02	0.76	0.21	0.13	3.12	2.47	5.22	1.27	7.41	38.96	5.35	44.32
40	14.81	4.19	0.80	0.21	0.15	3.12	2.47	5.51	1.34	7.81	40.40	5.65	46.05
45	15.39	4.38	0.85	0.21	0.16	3.12	2.47	5.82	1.42	8.27	42.09	5.97	48.06
50	16.16	4.59	0.90	0.21	0.17	3.12	2.47	6.18	1.50	8.77	44.07	6.34	50.41

Table VOC HCV 66 Financial Cost of Operation of HCV on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	3	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.28	2.46	0.40	0.19	0.04	2.16	1.71	3.63	0.88	5.16	29.91	3.73	33.64
5	13.07	2.53	0.45	0.19	0.05	2.16	1.71	3.77	0.92	5.35	30.19	3.87	34.06
10	12.91	2.59	0.50	0.19	0.06	2.16	1.71	3.92	0.95	5.56	30.55	4.02	34.57
15	12.80	2.67	0.55	0.19	0.08	2.16	1.71	4.07	0.99	5.78	31.00	4.18	35.18
20	12.75	2.74	0.60	0.19	0.09	2.16	1.71	4.25	1.03	6.03	31.55	4.36	35.91
25	12.77	2.82	0.64	0.19	0.11	2.16	1.71	4.43	1.08	6.29	32.21	4.55	36.76
30	12.87	2.91	0.69	0.19	0.12	2.16	1.71	4.64	1.13	6.58	33.00	4.76	37.75
35	13.05	3.00	0.74	0.19	0.13	2.16	1.71	4.86	1.18	6.90	33.92	4.99	38.91
40	13.32	3.09	0.79	0.19	0.15	2.16	1.71	5.11	1.24	7.25	35.01	5.24	40.25
45	13.71	3.19	0.84	0.19	0.16	2.16	1.71	5.38	1.31	7.64	36.29	5.52	41.82
50	14.23	3.30	0.88	0.19	0.17	2.16	1.71	5.69	1.38	8.07	37.80	5.83	43.63

Table VOC HCV 67
Financial Cost of Operation of HCV on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.60	2.50	0.41	0.20	0.04	2.49	1.97	3.69	0.90	5.23	31.01	3.78	34.80
5	13.41	2.56	0.46	0.20	0.05	2.49	1.97	3.83	0.93	5.43	31.32	3.93	35.25
10	13.27	2.63	0.51	0.20	0.06	2.49	1.97	3.98	0.97	5.65	31.72	4.08	35.80
15	13.19	2.71	0.55	0.20	0.08	2.49	1.97	4.14	1.01	5.88	32.21	4.25	36.46
20	13.17	2.78	0.60	0.20	0.09	2.49	1.97	4.32	1.05	6.13	32.80	4.43	37.23
25	13.21	2.87	0.65	0.20	0.11	2.49	1.97	4.51	1.10	6.41	33.51	4.63	38.14
30	13.34	2.95	0.70	0.20	0.12	2.49	1.97	4.72	1.15	6.71	34.35	4.85	39.19
35	13.55	3.05	0.75	0.20	0.13	2.49	1.97	4.96	1.20	7.04	35.34	5.09	40.42
40	13.87	3.15	0.79	0.20	0.15	2.49	1.97	5.21	1.27	7.40	36.50	5.35	41.85
45	14.31	3.25	0.84	0.20	0.16	2.49	1.97	5.50	1.34	7.81	37.87	5.64	43.51
50	14.89	3.37	0.89	0.20	0.17	2.49	1.97	5.82	1.41	8.26	39.47	5.97	45.44

Table VOC HCV 68
Financial Cost of Operation of HCV on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.93	2.53	0.41	0.21	0.04	2.87	2.27	3.74	0.91	5.31	32.22	3.84	36.05
5	13.76	2.60	0.46	0.21	0.05	2.87	2.27	3.88	0.94	5.51	32.56	3.99	36.54
10	13.64	2.67	0.51	0.21	0.06	2.87	2.27	4.04	0.98	5.74	32.99	4.15	37.14
15	13.58	2.75	0.56	0.21	0.08	2.87	2.27	4.21	1.02	5.98	33.52	4.32	37.84
20	13.59	2.83	0.61	0.21	0.09	2.87	2.27	4.39	1.07	6.24	34.16	4.51	38.66
25	13.66	2.91	0.65	0.21	0.11	2.87	2.27	4.59	1.12	6.52	34.92	4.71	39.63
30	13.82	3.00	0.70	0.21	0.12	2.87	2.27	4.81	1.17	6.83	35.81	4.94	40.75
35	14.08	3.10	0.75	0.21	0.13	2.87	2.27	5.06	1.23	7.18	36.87	5.19	42.06
40	14.44	3.20	0.80	0.21	0.15	2.87	2.27	5.32	1.29	7.56	38.11	5.46	43.57
45	14.93	3.31	0.85	0.21	0.16	2.87	2.27	5.62	1.37	7.98	39.57	5.77	45.33
50	15.58	3.43	0.89	0.21	0.17	2.87	2.27	5.95	1.45	8.45	41.28	6.11	47.39

Table VOC MCV 1 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.92	5.27	0.49	0.09	0.02	3.59	2.84	5.32	1.03	7.74	39.32	0.00	39.32
5	13.28	5.57	0.81	0.09	0.02	3.59	2.84	5.50	1.06	8.00	40.78	0.00	40.78
10	13.70	5.91	1.12	0.09	0.03	3.59	2.84	5.70	1.10	8.29	42.38	0.00	42.38
15	14.18	6.29	1.44	0.09	0.04	3.59	2.84	5.91	1.14	8.59	44.12	0.00	44.12
20	14.74	6.72	1.75	0.09	0.04	3.59	2.84	6.14	1.18	8.92	46.03	0.00	46.03
25	15.39	7.22	2.07	0.09	0.05	3.59	2.84	6.38	1.23	9.27	48.13	0.00	48.13
30	16.13	7.80	2.38	0.09	0.06	3.59	2.84	6.64	1.28	9.66	50.48	0.00	50.48
35	17.00	8.47	2.69	0.09	0.06	3.59	2.84	6.93	1.33	10.07	53.10	0.00	53.10
40	18.01	9.28	3.01	0.09	0.07	3.59	2.84	7.24	1.40	10.53	56.07	0.00	56.07
45	19.20	10.25	3.32	0.09	0.08	3.59	2.84	7.58	1.46	11.03	59.46	0.00	59.46
50	20.61	11.45	3.64	0.09	0.08	3.59	2.84	7.96	1.53	11.57	63.38	0.00	63.38

Table VOC MCV 2 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.37	5.42	0.61	0.10	0.02	4.14	3.27	5.39	1.04	7.84	41.20	0.00	41.20
5	13.75	5.74	0.92	0.10	0.02	4.14	3.27	5.58	1.07	8.11	42.72	0.00	42.72
10	14.20	6.10	1.24	0.10	0.03	4.14	3.27	5.78	1.11	8.40	44.37	0.00	44.37
15	14.71	6.50	1.55	0.10	0.04	4.14	3.27	6.00	1.16	8.72	46.18	0.00	46.18
20	15.30	6.97	1.87	0.10	0.04	4.14	3.27	6.23	1.20	9.06	48.18	0.00	48.18
25	15.98	7.50	2.18	0.10	0.05	4.14	3.27	6.48	1.25	9.42	50.38	0.00	50.38
30	16.77	8.13	2.50	0.10	0.06	4.14	3.27	6.75	1.30	9.82	52.84	0.00	52.84
35	17.70	8.86	2.81	0.10	0.06	4.14	3.27	7.05	1.36	10.25	55.60	0.00	55.60
40	18.78	9.75	3.13	0.10	0.07	4.14	3.27	7.37	1.42	10.72	58.75	0.00	58.75
45	20.05	10.83	3.44	0.10	0.08	4.14	3.27	7.73	1.49	11.24	62.36	0.00	62.36
50	21.56	12.18	3.75	0.10	0.08	4.14	3.27	8.12	1.56	11.81	66.58	0.00	66.58

Table VOC MCV 3 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.83	5.58	0.72	0.10	0.02	4.77	3.77	5.47	1.05	7.95	43.25	0.00	43.25
5	14.23	5.92	1.04	0.10	0.02	4.77	3.77	5.66	1.09	8.23	44.83	0.00	44.83
10	14.70	6.30	1.35	0.10	0.03	4.77	3.77	5.87	1.13	8.53	46.55	0.00	46.55
15	15.24	6.73	1.67	0.10	0.04	4.77	3.77	6.09	1.17	8.85	48.43	0.00	48.43
20	15.87	7.23	1.98	0.10	0.04	4.77	3.77	6.33	1.22	9.20	50.51	0.00	50.51
25	16.60	7.81	2.30	0.10	0.05	4.77	3.77	6.59	1.27	9.58	52.82	0.00	52.82
30	17.44	8.48	2.61	0.10	0.06	4.77	3.77	6.87	1.32	9.99	55.41	0.00	55.41
35	18.42	9.29	2.93	0.10	0.06	4.77	3.77	7.18	1.38	10.43	58.33	0.00	58.33
40	19.57	10.27	3.24	0.10	0.07	4.77	3.77	7.51	1.45	10.92	61.67	0.00	61.67
45	20.93	11.47	3.56	0.10	0.08	4.77	3.77	7.88	1.52	11.46	65.53	0.00	65.53
50	22.55	13.00	3.87	0.10	0.08	4.77	3.77	8.29	1.60	12.05	70.08	0.00	70.08

Table VOC MCV 4 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	_	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.29	5.74	0.84	0.11	0.02	5.49	4.34	5.54	1.07	8.06	45.50	0.00	45.50
5	14.72	6.10	1.16	0.11	0.02	5.49	4.34	5.74	1.11	8.34	47.14	0.00	47.14
10	15.22	6.51	1.47	0.11	0.03	5.49	4.34	5.95	1.15	8.65	48.93	0.00	48.93
15	15.79	6.98	1.78	0.11	0.04	5.49	4.34	6.18	1.19	8.99	50.89	0.00	50.89
20	16.46	7.51	2.10	0.11	0.04	5.49	4.34	6.43	1.24	9.35	53.07	0.00	53.07
25	17.23	8.14	2.41	0.11	0.05	5.49	4.34	6.70	1.29	9.74	55.49	0.00	55.49
30	18.12	8.88	2.73	0.11	0.06	5.49	4.34	6.99	1.35	10.16	58.22	0.00	58.22
35	19.17	9.76	3.04	0.11	0.06	5.49	4.34	7.31	1.41	10.62	61.31	0.00	61.31
40	20.40	10.85	3.36	0.11	0.07	5.49	4.34	7.66	1.47	11.13	64.87	0.00	64.87
45	21.85	12.20	3.67	0.11	0.08	5.49	4.34	8.04	1.55	11.69	69.02	0.00	69.02
50	23.60	13.94	3.99	0.11	0.08	5.49	4.34	8.46	1.63	12.30	73.95	0.00	73.95

Table VOC MCV 5 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.77	5.92	0.96	0.11	0.02	6.32	5.00	5.62	1.08	8.17	47.97	0.00	47.97
5	15.23	6.30	1.27	0.11	0.02	6.32	5.00	5.82	1.12	8.46	49.67	0.00	49.67
10	15.75	6.74	1.59	0.11	0.03	6.32	5.00	6.04	1.16	8.78	51.53	0.00	51.53
15	16.36	7.24	1.90	0.11	0.04	6.32	5.00	6.28	1.21	9.13	53.59	0.00	53.59
20	17.06	7.82	2.22	0.11	0.04	6.32	5.00	6.53	1.26	9.50	55.87	0.00	55.87
25	17.88	8.50	2.53	0.11	0.05	6.32	5.00	6.81	1.31	9.90	58.42	0.00	58.42
30	18.83	9.30	2.85	0.11	0.06	6.32	5.00	7.11	1.37	10.34	61.30	0.00	61.30
35	19.94	10.28	3.16	0.11	0.06	6.32	5.00	7.44	1.43	10.82	64.58	0.00	64.58
40	21.26	11.49	3.47	0.11	0.07	6.32	5.00	7.80	1.50	11.34	68.38	0.00	68.38
45	22.82	13.03	3.79	0.11	0.08	6.32	5.00	8.20	1.58	11.92	72.86	0.00	72.86
50	24.71	15.03	4.10	0.11	0.08	6.32	5.00	8.64	1.67	12.57	78.23	0.00	78.23

Table VOC MCV 6 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.26	6.11	1.07	0.12	0.02	7.28	5.76	5.70	1.10	8.28	50.70	0.00	50.70
5	15.74	6.52	1.39	0.12	0.02	7.28	5.76	5.91	1.14	8.59	52.46	0.00	52.46
10	16.30	6.98	1.70	0.12	0.03	7.28	5.76	6.13	1.18	8.92	54.40	0.00	54.40
15	16.94	7.52	2.02	0.12	0.04	7.28	5.76	6.38	1.23	9.27	56.55	0.00	56.55
20	17.68	8.15	2.33	0.12	0.04	7.28	5.76	6.64	1.28	9.65	58.94	0.00	58.94
25	18.55	8.89	2.65	0.12	0.05	7.28	5.76	6.93	1.33	10.07	61.63	0.00	61.63
30	19.56	9.78	2.96	0.12	0.06	7.28	5.76	7.24	1.39	10.52	64.68	0.00	64.68
35	20.75	10.86	3.28	0.12	0.06	7.28	5.76	7.58	1.46	11.02	68.18	0.00	68.18
40	22.16	12.22	3.59	0.12	0.07	7.28	5.76	7.96	1.53	11.57	72.26	0.00	72.26
45	23.84	13.97	3.91	0.12	0.08	7.28	5.76	8.37	1.61	12.17	77.11	0.00	77.11
50	25.88	16.30	4.22	0.12	0.08	7.28	5.76	8.83	1.70	12.84	83.02	0.00	83.02

Table VOC MCV 7 Economic Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	15.75	6.31	1.19	0.12	0.02	8.39	6.64	5.78	1.11	8.40	53.71	0.00	53.71
5	16.26	6.75	1.50	0.12	0.02	8.39	6.64	6.00	1.16	8.72	55.55	0.00	55.55
10	16.85	7.25	1.82	0.12	0.03	8.39	6.64	6.23	1.20	9.05	57.58	0.00	57.58
15	17.53	7.83	2.13	0.12	0.04	8.39	6.64	6.48	1.25	9.42	59.83	0.00	59.83
20	18.33	8.51	2.45	0.12	0.04	8.39	6.64	6.75	1.30	9.82	62.34	0.00	62.34
25	19.25	9.32	2.76	0.12	0.05	8.39	6.64	7.05	1.36	10.25	65.18	0.00	65.18
30	20.33	10.30	3.08	0.12	0.06	8.39	6.64	7.37	1.42	10.72	68.42	0.00	68.42
35	21.60	11.51	3.39	0.12	0.06	8.39	6.64	7.73	1.49	11.23	72.16	0.00	72.16
40	23.11	13.05	3.71	0.12	0.07	8.39	6.64	8.12	1.56	11.80	76.56	0.00	76.56
45	24.92	15.06	4.02	0.12	0.08	8.39	6.64	8.55	1.65	12.43	81.85	0.00	81.85
50	27.12	17.81	4.34	0.12	0.08	8.39	6.64	9.03	1.74	13.13	88.40	0.00	88.40

Table VOC MCV 8 Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

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RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.09	4.42	0.42	0.09	0.02	2.67	2.11	4.96	0.96	7.21	34.96	0.00	34.96
5	12.39	4.63	0.73	0.09	0.02	2.67	2.11	5.14	0.99	7.47	36.25	0.00	36.25
10	12.74	4.86	1.05	0.09	0.03	2.67	2.11	5.32	1.03	7.74	37.64	0.00	37.64
15	13.15	5.12	1.36	0.09	0.04	2.67	2.11	5.52	1.06	8.03	39.16	0.00	39.16
20	13.63	5.40	1.68	0.09	0.04	2.67	2.11	5.74	1.11	8.35	40.82	0.00	40.82
25	14.19	5.72	1.99	0.09	0.05	2.67	2.11	5.98	1.15	8.69	42.64	0.00	42.64
30	14.84	6.07	2.31	0.09	0.06	2.67	2.11	6.23	1.20	9.06	44.65	0.00	44.65
35	15.61	6.48	2.62	0.09	0.06	2.67	2.11	6.51	1.25	9.46	46.88	0.00	46.88
40	16.51	6.94	2.94	0.09	0.07	2.67	2.11	6.81	1.31	9.91	49.37	0.00	49.37
45	17.58	7.47	3.25	0.09	0.08	2.67	2.11	7.15	1.38	10.39	52.17	0.00	52.17
50	18.85	8.08	3.56	0.09	0.08	2.67	2.11	7.52	1.45	10.93	55.35	0.00	55.35

Table VOC MCV 9
Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.51	4.53	0.50	0.10	0.02	3.08	2.43	5.03	0.97	7.31	36.47	0.00	36.47
5	12.83	4.75	0.81	0.10	0.02	3.08	2.43	5.21	1.00	7.57	37.81	0.00	37.81
10	13.20	4.99	1.13	0.10	0.03	3.08	2.43	5.40	1.04	7.85	39.25	0.00	39.25
15	13.64	5.26	1.44	0.10	0.04	3.08	2.43	5.61	1.08	8.15	40.83	0.00	40.83
20	14.15	5.56	1.76	0.10	0.04	3.08	2.43	5.83	1.12	8.48	42.55	0.00	42.55
25	14.75	5.89	2.07	0.10	0.05	3.08	2.43	6.08	1.17	8.83	44.45	0.00	44.45
30	15.44	6.27	2.39	0.10	0.06	3.08	2.43	6.34	1.22	9.21	46.54	0.00	46.54
35	16.26	6.70	2.70	0.10	0.06	3.08	2.43	6.63	1.28	9.63	48.87	0.00	48.87
40	17.22	7.19	3.01	0.10	0.07	3.08	2.43	6.94	1.34	10.09	51.48	0.00	51.48
45	18.36	7.77	3.33	0.10	0.08	3.08	2.43	7.29	1.40	10.60	54.43	0.00	54.43
50	19.72	8.44	3.64	0.10	0.08	3.08	2.43	7.67	1.48	11.15	57.80	0.00	57.80

Table VOC MCV 10 Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.94	4.64	0.58	0.10	0.02	3.54	2.80	5.10	0.98	7.41	38.11	0.00	38.11
5	13.28	4.87	0.89	0.10	0.02	3.54	2.80	5.28	1.02	7.68	39.49	0.00	39.49
10	13.68	5.12	1.21	0.10	0.03	3.54	2.80	5.48	1.06	7.97	40.99	0.00	40.99
15	14.14	5.41	1.52	0.10	0.04	3.54	2.80	5.69	1.10	8.28	42.63	0.00	42.63
20	14.69	5.72	1.84	0.10	0.04	3.54	2.80	5.93	1.14	8.61	44.42	0.00	44.42
25	15.32	6.08	2.15	0.10	0.05	3.54	2.80	6.18	1.19	8.98	46.39	0.00	46.39
30	16.06	6.48	2.46	0.10	0.06	3.54	2.80	6.45	1.24	9.38	48.58	0.00	48.58
35	16.93	6.94	2.78	0.10	0.06	3.54	2.80	6.75	1.30	9.81	51.03	0.00	51.03
40	17.96	7.47	3.09	0.10	0.07	3.54	2.80	7.07	1.36	10.28	53.77	0.00	53.77
45	19.18	8.09	3.41	0.10	0.08	3.54	2.80	7.44	1.43	10.81	56.89	0.00	56.89
50	20.65	8.82	3.72	0.10	0.08	3.54	2.80	7.83	1.51	11.39	60.46	0.00	60.46

Table VOC MCV 11
Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.38	4.75	0.66	0.11	0.02	4.08	3.23	5.17	1.00	7.51	39.90	0.00	39.90
5	13.74	4.99	0.97	0.11	0.02	4.08	3.23	5.36	1.03	7.79	41.33	0.00	41.33
10	14.16	5.26	1.29	0.11	0.03	4.08	3.23	5.56	1.07	8.09	42.88	0.00	42.88
15	14.66	5.56	1.60	0.11	0.04	4.08	3.23	5.78	1.11	8.41	44.58	0.00	44.58
20	15.24	5.90	1.91	0.11	0.04	4.08	3.23	6.02	1.16	8.75	46.45	0.00	46.45
25	15.91	6.28	2.23	0.11	0.05	4.08	3.23	6.28	1.21	9.13	48.51	0.00	48.51
30	16.70	6.71	2.54	0.11	0.06	4.08	3.23	6.56	1.26	9.54	50.80	0.00	50.80
35	17.63	7.20	2.86	0.11	0.06	4.08	3.23	6.87	1.32	9.99	53.36	0.00	53.36
40	18.73	7.78	3.17	0.11	0.07	4.08	3.23	7.21	1.39	10.48	56.25	0.00	56.25
45	20.04	8.45	3.49	0.11	0.08	4.08	3.23	7.59	1.46	11.03	59.55	0.00	59.55
50	21.61	9.25	3.80	0.11	0.08	4.08	3.23	8.00	1.54	11.63	63.35	0.00	63.35

Table VOC MCV 12 Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.83	4.87	0.74	0.11	0.02	4.70	3.72	5.24	1.01	7.62	41.86	0.00	41.86
5	14.21	5.13	1.05	0.11	0.02	4.70	3.72	5.44	1.05	7.90	43.34	0.00	43.34
10	14.66	5.41	1.36	0.11	0.03	4.70	3.72	5.65	1.09	8.21	44.95	0.00	44.95
15	15.19	5.73	1.68	0.11	0.04	4.70	3.72	5.88	1.13	8.54	46.71	0.00	46.71
20	15.80	6.08	1.99	0.11	0.04	4.70	3.72	6.12	1.18	8.90	48.66	0.00	48.66
25	16.52	6.49	2.31	0.11	0.05	4.70	3.72	6.39	1.23	9.29	50.81	0.00	50.81
30	17.36	6.95	2.62	0.11	0.06	4.70	3.72	6.68	1.29	9.71	53.21	0.00	53.21
35	18.35	7.48	2.94	0.11	0.06	4.70	3.72	7.00	1.35	10.18	55.90	0.00	55.90
40	19.53	8.10	3.25	0.11	0.07	4.70	3.72	7.36	1.42	10.69	58.95	0.00	58.95
45	20.94	8.84	3.57	0.11	0.08	4.70	3.72	7.75	1.49	11.26	62.45	0.00	62.45
50	22.64	9.71	3.88	0.11	0.08	4.70	3.72	8.18	1.58	11.89	66.49	0.00	66.49

Table VOC MCV 13
Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	,		Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.28	5.00	0.81	0.12	0.02	5.42	4.28	5.32	1.02	7.73	44.00	0.00	44.00
5	14.69	5.27	1.13	0.12	0.02	5.42	4.28	5.52	1.06	8.02	45.53	0.00	45.53
10	15.17	5.57	1.44	0.12	0.03	5.42	4.28	5.74	1.10	8.34	47.21	0.00	47.21
15	15.73	5.90	1.76	0.12	0.04	5.42	4.28	5.97	1.15	8.68	49.04	0.00	49.04
20	16.38	6.28	2.07	0.12	0.04	5.42	4.28	6.22	1.20	9.05	51.07	0.00	51.07
25	17.14	6.71	2.39	0.12	0.05	5.42	4.28	6.50	1.25	9.45	53.32	0.00	53.32
30	18.04	7.21	2.70	0.12	0.06	5.42	4.28	6.81	1.31	9.89	55.84	0.00	55.84
35	19.10	7.78	3.02	0.12	0.06	5.42	4.28	7.14	1.38	10.38	58.67	0.00	58.67
40	20.36	8.46	3.33	0.12	0.07	5.42	4.28	7.51	1.45	10.91	61.90	0.00	61.90
45	21.88	9.26	3.65	0.12	0.08	5.42	4.28	7.91	1.52	11.50	65.61	0.00	65.61
50	23.72	10.23	3.96	0.12	0.08	5.42	4.28	8.37	1.61	12.16	69.94	0.00	69.94

Table VOC MCV 14 Economic Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	14.75	5.13	0.89	0.12	0.02	6.24	4.94	5.39	1.04	7.84	46.36	0.00	46.36
5	15.18	5.42	1.21	0.12	0.02	6.24	4.94	5.60	1.08	8.14	47.95	0.00	47.95
10	15.69	5.73	1.52	0.12	0.03	6.24	4.94	5.83	1.12	8.47	49.69	0.00	49.69
15	16.28	6.09	1.84	0.12	0.04	6.24	4.94	6.07	1.17	8.82	51.60	0.00	51.60
20	16.98	6.50	2.15	0.12	0.04	6.24	4.94	6.33	1.22	9.20	53.72	0.00	53.72
25	17.79	6.96	2.47	0.12	0.05	6.24	4.94	6.62	1.27	9.62	56.07	0.00	56.07
30	18.75	7.49	2.78	0.12	0.06	6.24	4.94	6.93	1.34	10.08	58.72	0.00	58.72
35	19.89	8.11	3.10	0.12	0.06	6.24	4.94	7.28	1.40	10.58	61.71	0.00	61.71
40	21.24	8.85	3.41	0.12	0.07	6.24	4.94	7.66	1.48	11.14	65.13	0.00	65.13
45	22.87	9.73	3.73	0.12	0.08	6.24	4.94	8.08	1.56	11.75	69.09	0.00	69.09
50	24.86	10.80	4.04	0.12	0.08	6.24	4.94	8.56	1.65	12.44	73.73	0.00	73.73

Table VOC MCV 15 Economic Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	11.60	3.89	0.38	0.09	0.02	2.33	1.84	4.72	0.91	6.87	32.65	1.56	34.22
5	11.85	4.05	0.70	0.09	0.02	2.33	1.84	4.89	0.94	7.11	33.83	1.62	35.45
10	12.15	4.22	1.01	0.09	0.03	2.33	1.84	5.07	0.98	7.37	35.11	1.68	36.79
15	12.51	4.41	1.33	0.09	0.04	2.33	1.84	5.27	1.01	7.66	36.50	1.74	38.24
20	12.94	4.62	1.64	0.09	0.04	2.33	1.84	5.48	1.06	7.96	38.01	1.81	39.82
25	13.44	4.85	1.96	0.09	0.05	2.33	1.84	5.71	1.10	8.29	39.67	1.89	41.55
30	14.03	5.11	2.27	0.09	0.06	2.33	1.84	5.95	1.15	8.65	41.49	1.97	43.46
35	14.73	5.39	2.59	0.09	0.06	2.33	1.84	6.22	1.20	9.05	43.50	2.06	45.56
40	15.55	5.70	2.90	0.09	0.07	2.33	1.84	6.52	1.26	9.48	45.74	2.15	47.90
45	16.52	6.05	3.22	0.09	0.08	2.33	1.84	6.84	1.32	9.95	48.26	2.26	50.52
50	17.69	6.45	3.53	0.09	0.08	2.33	1.84	7.20	1.39	10.47	51.09	2.38	53.47

Table VOC MCV 16 Economic Cost of Operation of MCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.00	3.97	0.45	0.10	0.02	2.69	2.13	4.79	0.92	6.96	34.01	1.58	35.60
5	12.27	4.13	0.76	0.10	0.02	2.69	2.13	4.96	0.96	7.21	35.23	1.64	36.87
10	12.60	4.32	1.08	0.10	0.03	2.69	2.13	5.15	0.99	7.48	36.55	1.70	38.25
15	12.98	4.52	1.39	0.10	0.04	2.69	2.13	5.35	1.03	7.78	37.99	1.77	39.76
20	13.44	4.74	1.71	0.10	0.04	2.69	2.13	5.57	1.07	8.09	39.56	1.84	41.40
25	13.97	4.98	2.02	0.10	0.05	2.69	2.13	5.80	1.12	8.43	41.28	1.92	43.20
30	14.60	5.24	2.33	0.10	0.06	2.69	2.13	6.06	1.17	8.81	43.18	2.00	45.18
35	15.35	5.54	2.65	0.10	0.06	2.69	2.13	6.34	1.22	9.21	45.28	2.09	47.37
40	16.23	5.88	2.96	0.10	0.07	2.69	2.13	6.64	1.28	9.66	47.63	2.20	49.82
45	17.27	6.25	3.28	0.10	0.08	2.69	2.13	6.98	1.35	10.15	50.27	2.31	52.57
50	18.52	6.68	3.59	0.10	0.08	2.69	2.13	7.36	1.42	10.70	53.26	2.43	55.69

Table VOC MCV 17 Economic Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.41	4.05	0.51	0.10	0.02	3.09	2.45	4.86	0.94	7.06	35.48	1.60	37.09
5	12.71	4.23	0.82	0.10	0.02	3.09	2.45	5.03	0.97	7.32	36.74	1.66	38.41
10	13.05	4.42	1.14	0.10	0.03	3.09	2.45	5.23	1.01	7.60	38.11	1.73	39.84
15	13.46	4.63	1.45	0.10	0.04	3.09	2.45	5.43	1.05	7.90	39.60	1.80	41.39
20	13.95	4.86	1.77	0.10	0.04	3.09	2.45	5.66	1.09	8.22	41.23	1.87	43.10
25	14.52	5.11	2.08	0.10	0.05	3.09	2.45	5.90	1.14	8.58	43.02	1.95	44.97
30	15.19	5.39	2.40	0.10	0.06	3.09	2.45	6.17	1.19	8.96	45.00	2.04	47.03
35	15.99	5.71	2.71	0.10	0.06	3.09	2.45	6.46	1.24	9.38	47.19	2.13	49.33
40	16.93	6.06	3.03	0.10	0.07	3.09	2.45	6.77	1.31	9.85	49.66	2.24	51.89
45	18.05	6.46	3.34	0.10	0.08	3.09	2.45	7.13	1.37	10.36	52.43	2.36	54.79
50	19.40	6.92	3.66	0.10	0.08	3.09	2.45	7.52	1.45	10.93	55.59	2.48	58.08

Table VOC MCV 18 Economic Cost of Operation of MCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	12.83	4.14	0.57	0.11	0.02	3.56	2.82	4.92	0.95	7.16	37.08	1.63	38.71
5	13.15	4.32	0.89	0.11	0.02	3.56	2.82	5.11	0.98	7.43	38.38	1.69	40.07
10	13.52	4.52	1.20	0.11	0.03	3.56	2.82	5.31	1.02	7.71	39.80	1.75	41.55
15	13.96	4.74	1.52	0.11	0.04	3.56	2.82	5.52	1.06	8.02	41.34	1.82	43.17
20	14.48	4.98	1.83	0.11	0.04	3.56	2.82	5.75	1.11	8.36	43.04	1.90	44.94
25	15.08	5.25	2.14	0.11	0.05	3.56	2.82	6.00	1.16	8.72	44.90	1.98	46.88
30	15.80	5.55	2.46	0.11	0.06	3.56	2.82	6.28	1.21	9.12	46.96	2.07	49.04
35	16.65	5.88	2.77	0.11	0.06	3.56	2.82	6.58	1.27	9.56	49.27	2.17	51.44
40	17.66	6.26	3.09	0.11	0.07	3.56	2.82	6.91	1.33	10.04	51.85	2.28	54.13
45	18.87	6.69	3.40	0.11	0.08	3.56	2.82	7.28	1.40	10.58	54.77	2.40	57.18
50	20.32	7.18	3.72	0.11	0.08	3.56	2.82	7.68	1.48	11.17	58.12	2.54	60.66

Table VOC MCV 19 Economic Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	13.26	4.23	0.63	0.11	0.02	4.10	3.25	5.00	0.96	7.26	38.82	1.65	40.47
5	13.60	4.42	0.95	0.11	0.02	4.10	3.25	5.18	1.00	7.54	40.17	1.71	41.88
10	14.00	4.63	1.26	0.11	0.03	4.10	3.25	5.39	1.04	7.83	41.64	1.78	43.42
15	14.46	4.86	1.58	0.11	0.04	4.10	3.25	5.61	1.08	8.15	43.24	1.85	45.09
20	15.02	5.11	1.89	0.11	0.04	4.10	3.25	5.85	1.13	8.50	45.00	1.93	46.93
25	15.67	5.40	2.21	0.11	0.05	4.10	3.25	6.11	1.18	8.88	46.94	2.02	48.96
30	16.43	5.71	2.52	0.11	0.06	4.10	3.25	6.39	1.23	9.29	49.10	2.11	51.21
35	17.34	6.07	2.84	0.11	0.06	4.10	3.25	6.71	1.29	9.75	51.51	2.22	53.73
40	18.42	6.47	3.15	0.11	0.07	4.10	3.25	7.05	1.36	10.25	54.23	2.33	56.56
45	19.72	6.93	3.47	0.11	0.08	4.10	3.25	7.43	1.43	10.80	57.32	2.46	59.77
50	21.29	7.45	3.78	0.11	0.08	4.10	3.25	7.86	1.51	11.42	60.86	2.60	63.46

Table VOC MCV 20 Economic Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.96	3.89	0.38	0.09	0.02	2.33	1.84	3.23	0.62	4.69	27.06	4.45	31.52
5	9.86	4.05	0.70	0.09	0.02	2.33	1.84	3.36	0.65	4.88	27.78	4.63	32.41
10	9.80	4.22	1.01	0.09	0.03	2.33	1.84	3.49	0.67	5.08	28.58	4.82	33.40
15	9.79	4.41	1.33	0.09	0.04	2.33	1.84	3.64	0.70	5.29	29.48	5.02	34.50
20	9.83	4.62	1.64	0.09	0.04	2.33	1.84	3.80	0.73	5.53	30.48	5.25	35.72
25	9.93	4.85	1.96	0.09	0.05	2.33	1.84	3.98	0.77	5.79	31.59	5.49	37.08
30	10.09	5.11	2.27	0.09	0.06	2.33	1.84	4.18	0.80	6.07	32.85	5.76	38.61
35	10.33	5.39	2.59	0.09	0.06	2.33	1.84	4.39	0.85	6.38	34.26	6.05	40.31
40	10.67	5.70	2.90	0.09	0.07	2.33	1.84	4.63	0.89	6.73	35.86	6.38	42.24
45	11.11	6.05	3.22	0.09	0.08	2.33	1.84	4.89	0.94	7.11	37.67	6.75	44.42
50	11.68	6.45	3.53	0.09	0.08	2.33	1.84	5.19	1.00	7.54	39.75	7.16	46.90

Table VOC MCV 21 Economic Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.22	3.97	0.45	0.10	0.02	2.69	2.13	3.28	0.63	4.77	28.24	4.52	32.76
5	10.14	4.13	0.76	0.10	0.02	2.69	2.13	3.41	0.66	4.96	28.99	4.70	33.70
10	10.10	4.32	1.08	0.10	0.03	2.69	2.13	3.55	0.68	5.16	29.83	4.90	34.73
15	10.11	4.52	1.39	0.10	0.04	2.69	2.13	3.71	0.71	5.39	30.77	5.11	35.88
20	10.17	4.74	1.71	0.10	0.04	2.69	2.13	3.87	0.75	5.63	31.82	5.34	37.16
25	10.30	4.98	2.02	0.10	0.05	2.69	2.13	4.06	0.78	5.90	32.99	5.59	38.58
30	10.49	5.24	2.33	0.10	0.06	2.69	2.13	4.26	0.82	6.19	34.31	5.87	40.18
35	10.77	5.54	2.65	0.10	0.06	2.69	2.13	4.48	0.86	6.52	35.79	6.18	41.97
40	11.14	5.88	2.96	0.10	0.07	2.69	2.13	4.73	0.91	6.88	37.48	6.52	44.00
45	11.63	6.25	3.28	0.10	0.08	2.69	2.13	5.01	0.96	7.28	39.39	6.90	46.30
50	12.26	6.68	3.59	0.10	0.08	2.69	2.13	5.32	1.02	7.73	41.60	7.33	48.93

Table VOC MCV 22 Economic Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.50	4.05	0.51	0.10	0.02	3.09	2.45	3.33	0.64	4.84	29.53	4.59	34.12
5	10.43	4.23	0.82	0.10	0.02	3.09	2.45	3.47	0.67	5.04	30.32	4.78	35.10
10	10.41	4.42	1.14	0.10	0.03	3.09	2.45	3.61	0.70	5.25	31.20	4.98	36.18
15	10.44	4.63	1.45	0.10	0.04	3.09	2.45	3.77	0.73	5.48	32.18	5.20	37.38
20	10.53	4.86	1.77	0.10	0.04	3.09	2.45	3.94	0.76	5.73	33.28	5.44	38.71
25	10.68	5.11	2.08	0.10	0.05	3.09	2.45	4.14	0.80	6.01	34.51	5.70	40.21
30	10.90	5.39	2.40	0.10	0.06	3.09	2.45	4.35	0.84	6.32	35.89	5.99	41.88
35	11.22	5.71	2.71	0.10	0.06	3.09	2.45	4.58	0.88	6.66	37.46	6.31	43.77
40	11.63	6.06	3.03	0.10	0.07	3.09	2.45	4.84	0.93	7.03	39.23	6.67	45.90
45	12.17	6.46	3.34	0.10	0.08	3.09	2.45	5.13	0.99	7.45	41.26	7.07	48.33
50	12.87	6.92	3.66	0.10	0.08	3.09	2.45	5.45	1.05	7.93	43.60	7.52	51.12

Table VOC MCV 23 Economic Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.99	3.03	0.34	0.09	0.02	1.97	1.56	3.14	0.60	4.56	25.32	4.33	29.64
5	9.86	3.13	0.66	0.09	0.02	1.97	1.56	3.26	0.63	4.74	25.92	4.49	30.41
10	9.77	3.23	0.97	0.09	0.03	1.97	1.56	3.39	0.65	4.93	26.60	4.67	31.27
15	9.72	3.34	1.29	0.09	0.04	1.97	1.56	3.53	0.68	5.13	27.35	4.86	32.22
20	9.72	3.46	1.60	0.09	0.04	1.97	1.56	3.68	0.71	5.35	28.19	5.07	33.27
25	9.78	3.59	1.92	0.09	0.05	1.97	1.56	3.85	0.74	5.59	29.13	5.30	34.44
30	9.89	3.72	2.23	0.09	0.06	1.97	1.56	4.03	0.78	5.85	30.18	5.55	35.74
35	10.07	3.87	2.55	0.09	0.06	1.97	1.56	4.23	0.81	6.14	31.36	5.83	37.19
40	10.33	4.03	2.86	0.09	0.07	1.97	1.56	4.44	0.86	6.46	32.69	6.13	38.81
45	10.69	4.20	3.17	0.09	0.08	1.97	1.56	4.69	0.90	6.82	34.18	6.46	40.65
50	11.16	4.39	3.49	0.09	0.08	1.97	1.56	4.96	0.96	7.21	35.88	6.84	42.72

Table VOC MCV 24 Economic Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.24	3.08	0.38	0.10	0.02	2.27	1.80	3.19	0.61	4.63	26.33	4.39	30.72
5	10.13	3.18	0.70	0.10	0.02	2.27	1.80	3.31	0.64	4.81	26.96	4.56	31.52
10	10.06	3.28	1.01	0.10	0.03	2.27	1.80	3.44	0.66	5.00	27.67	4.75	32.41
15	10.03	3.40	1.33	0.10	0.04	2.27	1.80	3.59	0.69	5.21	28.46	4.95	33.40
20	10.05	3.52	1.64	0.10	0.04	2.27	1.80	3.74	0.72	5.44	29.34	5.16	34.50
25	10.12	3.65	1.96	0.10	0.05	2.27	1.80	3.92	0.75	5.69	30.32	5.40	35.72
30	10.26	3.80	2.27	0.10	0.06	2.27	1.80	4.10	0.79	5.97	31.42	5.66	37.08
35	10.48	3.95	2.59	0.10	0.06	2.27	1.80	4.31	0.83	6.27	32.65	5.94	38.60
40	10.78	4.11	2.90	0.10	0.07	2.27	1.80	4.54	0.87	6.60	34.05	6.26	40.30
45	11.17	4.30	3.22	0.10	0.08	2.27	1.80	4.79	0.92	6.97	35.62	6.61	42.23
50	11.69	4.49	3.53	0.10	0.08	2.27	1.80	5.08	0.98	7.38	37.41	7.00	44.41

Table VOC MCV 25 Economic Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.50	3.13	0.43	0.10	0.02	2.62	2.07	3.23	0.62	4.70	27.43	4.46	31.89
5	10.41	3.23	0.74	0.10	0.02	2.62	2.07	3.36	0.65	4.89	28.09	4.63	32.73
10	10.35	3.34	1.06	0.10	0.03	2.62	2.07	3.50	0.67	5.09	28.83	4.82	33.66
15	10.34	3.46	1.37	0.10	0.04	2.62	2.07	3.65	0.70	5.30	29.66	5.03	34.69
20	10.38	3.59	1.68	0.10	0.04	2.62	2.07	3.81	0.73	5.54	30.58	5.25	35.83
25	10.48	3.72	2.00	0.10	0.05	2.62	2.07	3.99	0.77	5.80	31.61	5.50	37.11
30	10.65	3.87	2.31	0.10	0.06	2.62	2.07	4.18	0.81	6.08	32.76	5.77	38.53
35	10.90	4.03	2.63	0.10	0.06	2.62	2.07	4.40	0.85	6.39	34.06	6.07	40.12
40	11.23	4.20	2.94	0.10	0.07	2.62	2.07	4.64	0.89	6.74	35.52	6.39	41.91
45	11.68	4.39	3.26	0.10	0.08	2.62	2.07	4.90	0.94	7.13	37.18	6.76	43.94
50	12.25	4.60	3.57	0.10	0.08	2.62	2.07	5.20	1.00	7.56	39.07	7.17	46.24

Table VOC MCV 26 Economic Cost of Operation of MCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.96	3.89	0.38	0.09	0.02	2.33	1.84	3.23	0.62	4.70	27.07	4.46	31.52
5	9.86	4.05	0.70	0.09	0.02	2.33	1.84	3.36	0.65	4.88	27.79	4.63	32.42
10	9.80	4.22	1.01	0.09	0.03	2.33	1.84	3.50	0.67	5.08	28.59	4.82	33.41
15	9.79	4.41	1.33	0.09	0.04	2.33	1.84	3.65	0.70	5.30	29.49	5.03	34.51
20	9.83	4.62	1.64	0.09	0.04	2.33	1.84	3.81	0.73	5.54	30.49	5.25	35.74
25	9.93	4.85	1.96	0.09	0.05	2.33	1.84	3.99	0.77	5.79	31.61	5.49	37.10
30	10.10	5.11	2.27	0.09	0.06	2.33	1.84	4.18	0.81	6.08	32.86	5.76	38.63
35	10.34	5.39	2.59	0.09	0.06	2.33	1.84	4.39	0.85	6.39	34.28	6.06	40.34
40	10.68	5.70	2.90	0.09	0.07	2.33	1.84	4.63	0.89	6.73	35.88	6.39	42.27
45	11.12	6.05	3.22	0.09	0.08	2.33	1.84	4.90	0.94	7.12	37.70	6.75	44.45
50	11.69	6.45	3.53	0.09	0.08	2.33	1.84	5.20	1.00	7.55	39.78	7.16	46.94

Table VOC MCV 27 Economic Cost of Operation of MCV on Four Lane Divided Expressways (Rs/km)

Roughness = 3000

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.22	3.97	0.45	0.10	0.02	2.69	2.13	3.28	0.63	4.77	28.25	4.52	32.77
5	10.14	4.13	0.76	0.10	0.02	2.69	2.13	3.41	0.66	4.96	29.00	4.71	33.71
10	10.10	4.32	1.08	0.10	0.03	2.69	2.13	3.55	0.68	5.17	29.84	4.90	34.74
15	10.11	4.52	1.39	0.10	0.04	2.69	2.13	3.71	0.71	5.39	30.78	5.11	35.89
20	10.18	4.74	1.71	0.10	0.04	2.69	2.13	3.88	0.75	5.64	31.83	5.35	37.17
25	10.30	4.98	2.02	0.10	0.05	2.69	2.13	4.06	0.78	5.90	33.00	5.60	38.60
30	10.50	5.24	2.33	0.10	0.06	2.69	2.13	4.26	0.82	6.20	34.32	5.88	40.20
35	10.77	5.54	2.65	0.10	0.06	2.69	2.13	4.49	0.86	6.52	35.81	6.19	42.00
40	11.15	5.88	2.96	0.10	0.07	2.69	2.13	4.74	0.91	6.88	37.50	6.53	44.03
45	11.64	6.25	3.28	0.10	0.08	2.69	2.13	5.01	0.97	7.29	39.42	6.91	46.33
50	12.27	6.68	3.59	0.10	0.08	2.69	2.13	5.33	1.03	7.74	41.63	7.34	48.97

Table VOC MCV 28 Economic Cost of Operation of MCV on Four Lane Divided Expressways (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.50	4.05	0.51	0.10	0.02	3.09	2.45	3.33	0.64	4.84	29.54	4.60	34.13
5	10.43	4.23	0.82	0.10	0.02	3.09	2.45	3.47	0.67	5.04	30.33	4.78	35.11
10	10.41	4.42	1.14	0.10	0.03	3.09	2.45	3.61	0.70	5.25	31.21	4.98	36.19
15	10.44	4.63	1.45	0.10	0.04	3.09	2.45	3.77	0.73	5.49	32.19	5.20	37.39
20	10.53	4.86	1.77	0.10	0.04	3.09	2.45	3.95	0.76	5.74	33.29	5.44	38.73
25	10.68	5.11	2.08	0.10	0.05	3.09	2.45	4.14	0.80	6.02	34.52	5.71	40.23
30	10.91	5.39	2.40	0.10	0.06	3.09	2.45	4.35	0.84	6.32	35.91	6.00	41.91
35	11.22	5.71	2.71	0.10	0.06	3.09	2.45	4.58	0.88	6.66	37.48	6.32	43.80
40	11.64	6.06	3.03	0.10	0.07	3.09	2.45	4.84	0.93	7.04	39.26	6.68	45.93
45	12.19	6.46	3.34	0.10	0.08	3.09	2.45	5.13	0.99	7.46	41.29	7.08	48.37
50	12.88	6.92	3.66	0.10	0.08	3.09	2.45	5.46	1.05	7.94	43.64	7.53	51.16

Table VOC MCV 29 Economic Cost of Operation of MCV on Six Lane Divided Expressways (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	9.99	3.03	0.34	0.09	0.02	1.97	1.56	3.14	0.61	4.57	25.32	4.33	29.65
5	9.86	3.13	0.66	0.09	0.02	1.97	1.56	3.26	0.63	4.74	25.93	4.50	30.42
10	9.77	3.23	0.97	0.09	0.03	1.97	1.56	3.39	0.65	4.93	26.60	4.68	31.28
15	9.72	3.34	1.29	0.09	0.04	1.97	1.56	3.53	0.68	5.13	27.36	4.87	32.23
20	9.72	3.46	1.60	0.09	0.04	1.97	1.56	3.68	0.71	5.35	28.20	5.08	33.28
25	9.78	3.59	1.92	0.09	0.05	1.97	1.56	3.85	0.74	5.59	29.15	5.31	34.45
30	9.89	3.72	2.23	0.09	0.06	1.97	1.56	4.03	0.78	5.86	30.20	5.56	35.75
35	10.08	3.87	2.55	0.09	0.06	1.97	1.56	4.23	0.81	6.15	31.38	5.83	37.21
40	10.34	4.03	2.86	0.09	0.07	1.97	1.56	4.45	0.86	6.47	32.70	6.14	38.84
45	10.70	4.20	3.17	0.09	0.08	1.97	1.56	4.69	0.90	6.82	34.20	6.47	40.68
50	11.17	4.39	3.49	0.09	0.08	1.97	1.56	4.97	0.96	7.22	35.91	6.85	42.75

Table VOC MCV 30 Economic Cost of Operation of MCV on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.24	3.08	0.38	0.10	0.02	2.27	1.80	3.19	0.61	4.64	26.33	4.40	30.73
5	10.13	3.18	0.70	0.10	0.02	2.27	1.80	3.31	0.64	4.81	26.97	4.57	31.53
10	10.06	3.28	1.01	0.10	0.03	2.27	1.80	3.45	0.66	5.01	27.68	4.75	32.43
15	10.03	3.40	1.33	0.10	0.04	2.27	1.80	3.59	0.69	5.22	28.47	4.95	33.42
20	10.05	3.52	1.64	0.10	0.04	2.27	1.80	3.75	0.72	5.45	29.35	5.17	34.51
25	10.13	3.65	1.96	0.10	0.05	2.27	1.80	3.92	0.75	5.70	30.33	5.40	35.74
30	10.27	3.80	2.27	0.10	0.06	2.27	1.80	4.11	0.79	5.97	31.44	5.66	37.10
35	10.48	3.95	2.59	0.10	0.06	2.27	1.80	4.31	0.83	6.27	32.67	5.95	38.62
40	10.78	4.11	2.90	0.10	0.07	2.27	1.80	4.54	0.88	6.61	34.07	6.27	40.33
45	11.18	4.30	3.22	0.10	0.08	2.27	1.80	4.80	0.92	6.98	35.64	6.62	42.26
50	11.71	4.49	3.53	0.10	0.08	2.27	1.80	5.08	0.98	7.39	37.44	7.01	44.45

Table VOC MCV 31
Economic Cost of Operation of MCV on Six Lane Divided Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.50	3.13	0.43	0.10	0.02	2.62	2.07	3.24	0.62	4.71	27.44	4.46	31.90
5	10.41	3.23	0.74	0.10	0.02	2.62	2.07	3.36	0.65	4.89	28.10	4.64	32.74
10	10.35	3.34	1.06	0.10	0.03	2.62	2.07	3.50	0.67	5.09	28.84	4.83	33.67
15	10.34	3.46	1.37	0.10	0.04	2.62	2.07	3.65	0.70	5.31	29.67	5.03	34.70
20	10.39	3.59	1.68	0.10	0.04	2.62	2.07	3.81	0.73	5.54	30.59	5.26	35.85
25	10.49	3.72	2.00	0.10	0.05	2.62	2.07	3.99	0.77	5.80	31.62	5.50	37.13
30	10.66	3.87	2.31	0.10	0.06	2.62	2.07	4.19	0.81	6.09	32.78	5.77	38.55
35	10.91	4.03	2.63	0.10	0.06	2.62	2.07	4.40	0.85	6.40	34.08	6.07	40.15
40	11.24	4.20	2.94	0.10	0.07	2.62	2.07	4.64	0.89	6.75	35.54	6.40	41.94
45	11.69	4.39	3.26	0.10	0.08	2.62	2.07	4.91	0.95	7.14	37.20	6.77	43.97
50	12.27	4.60	3.57	0.10	0.08	2.62	2.07	5.21	1.00	7.57	39.10	7.18	46.28

Table VOC MCV 32 Economic Cost of Operation of MCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.04	2.48	0.32	0.09	0.02	1.82	1.44	3.06	0.59	4.44	24.29	4.21	28.51
5	9.88	2.55	0.64	0.09	0.02	1.82	1.44	3.17	0.61	4.61	24.82	4.37	29.19
10	9.76	2.61	0.95	0.09	0.03	1.82	1.44	3.29	0.63	4.78	25.42	4.54	29.96
15	9.68	2.69	1.27	0.09	0.04	1.82	1.44	3.42	0.66	4.98	26.08	4.72	30.80
20	9.65	2.76	1.58	0.09	0.04	1.82	1.44	3.57	0.69	5.18	26.82	4.92	31.74
25	9.66	2.84	1.90	0.09	0.05	1.82	1.44	3.72	0.72	5.41	27.65	5.13	32.78
30	9.73	2.93	2.21	0.09	0.06	1.82	1.44	3.89	0.75	5.66	28.57	5.36	33.93
35	9.86	3.02	2.52	0.09	0.06	1.82	1.44	4.08	0.79	5.93	29.60	5.62	35.22
40	10.06	3.11	2.84	0.09	0.07	1.82	1.44	4.28	0.82	6.22	30.76	5.90	36.66
45	10.35	3.22	3.15	0.09	0.08	1.82	1.44	4.51	0.87	6.55	32.07	6.21	38.28
50	10.73	3.33	3.47	0.09	0.08	1.82	1.44	4.76	0.92	6.91	33.54	6.56	40.10

Table VOC MCV 33
Economic Cost of Operation of MCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.28	2.51	0.35	0.10	0.02	2.09	1.66	3.10	0.60	4.51	25.22	4.28	29.49
5	10.14	2.58	0.67	0.10	0.02	2.09	1.66	3.22	0.62	4.68	25.77	4.44	30.21
10	10.04	2.65	0.98	0.10	0.03	2.09	1.66	3.34	0.64	4.86	26.39	4.61	31.00
15	9.97	2.72	1.30	0.10	0.04	2.09	1.66	3.48	0.67	5.06	27.09	4.80	31.88
20	9.96	2.80	1.61	0.10	0.04	2.09	1.66	3.63	0.70	5.27	27.86	5.00	32.86
25	9.99	2.89	1.93	0.10	0.05	2.09	1.66	3.79	0.73	5.51	28.72	5.22	33.95
30	10.09	2.97	2.24	0.10	0.06	2.09	1.66	3.96	0.76	5.76	29.69	5.46	35.15
35	10.24	3.07	2.56	0.10	0.06	2.09	1.66	4.16	0.80	6.04	30.77	5.73	36.50
40	10.48	3.17	2.87	0.10	0.07	2.09	1.66	4.37	0.84	6.35	31.99	6.02	38.01
45	10.80	3.27	3.19	0.10	0.08	2.09	1.66	4.60	0.89	6.69	33.36	6.35	39.70
50	11.23	3.39	3.50	0.10	0.08	2.09	1.66	4.86	0.94	7.07	34.91	6.71	41.62

Table VOC MCV 34
Economic Cost of Operation of MCV on Eight Lane Divided Urban Expressways (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	10.53	2.55	0.38	0.10	0.02	2.41	1.91	3.15	0.61	4.57	26.23	4.34	30.57
5	10.41	2.62	0.70	0.10	0.02	2.41	1.91	3.27	0.63	4.75	26.81	4.50	31.31
10	10.32	2.69	1.01	0.10	0.03	2.41	1.91	3.40	0.65	4.94	27.46	4.68	32.14
15	10.27	2.76	1.33	0.10	0.04	2.41	1.91	3.54	0.68	5.14	28.18	4.88	33.06
20	10.28	2.84	1.64	0.10	0.04	2.41	1.91	3.69	0.71	5.36	28.99	5.09	34.08
25	10.33	2.93	1.96	0.10	0.05	2.41	1.91	3.86	0.74	5.60	29.89	5.32	35.21
30	10.45	3.02	2.27	0.10	0.06	2.41	1.91	4.04	0.78	5.87	30.91	5.57	36.47
35	10.64	3.12	2.59	0.10	0.06	2.41	1.91	4.24	0.82	6.16	32.04	5.84	37.88
40	10.91	3.22	2.90	0.10	0.07	2.41	1.91	4.46	0.86	6.48	33.31	6.15	39.46
45	11.27	3.33	3.22	0.10	0.08	2.41	1.91	4.70	0.91	6.84	34.76	6.49	41.24
50	11.74	3.45	3.53	0.10	0.08	2.41	1.91	4.98	0.96	7.24	36.39	6.86	43.26

Table VOC MCV 35 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	30.75	7.59	1.01	0.19	0.04	6.43	5.09	6.36	1.83	7.74	67.02	0.00	67.02
5	31.61	8.03	1.65	0.19	0.05	6.43	5.09	6.58	1.89	8.00	69.52	0.00	69.52
10	32.60	8.51	2.29	0.19	0.06	6.43	5.09	6.81	1.96	8.29	72.24	0.00	72.24
15	33.75	9.06	2.94	0.19	0.08	6.43	5.09	7.06	2.03	8.59	75.22	0.00	75.22
20	35.08	9.68	3.58	0.19	0.09	6.43	5.09	7.33	2.11	8.92	78.51	0.00	78.51
25	36.62	10.40	4.22	0.19	0.10	6.43	5.09	7.62	2.19	9.27	82.14	0.00	82.14
30	38.39	11.23	4.87	0.19	0.12	6.43	5.09	7.94	2.28	9.66	86.20	0.00	86.20
35	40.46	12.20	5.51	0.19	0.13	6.43	5.09	8.28	2.38	10.07	90.75	0.00	90.75
40	42.87	13.36	6.15	0.19	0.15	6.43	5.09	8.65	2.49	10.53	95.91	0.00	95.91
45	45.70	14.76	6.80	0.19	0.16	6.43	5.09	9.06	2.61	11.03	101.83	0.00	101.83
50	49.05	16.49	7.44	0.19	0.17	6.43	5.09	9.51	2.74	11.57	108.69	0.00	108.69

Table VOC MCV 36 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	31.82	7.81	1.24	0.20	0.04	7.41	5.86	6.44	1.85	7.84	70.51	0.00	70.51
5	32.73	8.26	1.89	0.20	0.05	7.41	5.86	6.67	1.92	8.11	73.10	0.00	73.10
10	33.78	8.78	2.53	0.20	0.06	7.41	5.86	6.91	1.99	8.40	75.93	0.00	75.93
15	35.00	9.36	3.17	0.20	0.08	7.41	5.86	7.16	2.06	8.72	79.03	0.00	79.03
20	36.41	10.03	3.82	0.20	0.09	7.41	5.86	7.44	2.14	9.06	82.46	0.00	82.46
25	38.03	10.80	4.46	0.20	0.10	7.41	5.86	7.74	2.23	9.42	86.27	0.00	86.27
30	39.92	11.70	5.11	0.20	0.12	7.41	5.86	8.07	2.32	9.82	90.53	0.00	90.53
35	42.11	12.76	5.75	0.20	0.13	7.41	5.86	8.42	2.42	10.25	95.33	0.00	95.33
40	44.68	14.04	6.39	0.20	0.15	7.41	5.86	8.81	2.54	10.72	100.80	0.00	100.80
45	47.71	15.59	7.04	0.20	0.16	7.41	5.86	9.23	2.66	11.24	107.10	0.00	107.10
50	51.31	17.53	7.68	0.20	0.17	7.41	5.86	9.70	2.79	11.81	114.46	0.00	114.46

Table VOC MCV 37 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	32.91	8.03	1.48	0.21	0.04	8.53	6.75	6.53	1.88	7.95	74.31	0.00	74.31
5	33.87	8.52	2.13	0.21	0.05	8.53	6.75	6.76	1.95	8.23	76.99	0.00	76.99
10	34.99	9.07	2.77	0.21	0.06	8.53	6.75	7.01	2.02	8.53	79.94	0.00	79.94
15	36.28	9.69	3.41	0.21	0.08	8.53	6.75	7.27	2.09	8.85	83.17	0.00	83.17
20	37.77	10.41	4.06	0.21	0.09	8.53	6.75	7.56	2.18	9.20	86.75	0.00	86.75
25	39.49	11.24	4.70	0.21	0.10	8.53	6.75	7.87	2.27	9.58	90.74	0.00	90.74
30	41.50	12.22	5.34	0.21	0.12	8.53	6.75	8.21	2.36	9.99	95.22	0.00	95.22
35	43.83	13.38	5.99	0.21	0.13	8.53	6.75	8.57	2.47	10.43	100.30	0.00	100.30
40	46.57	14.78	6.63	0.21	0.15	8.53	6.75	8.97	2.58	10.92	106.10	0.00	106.10
45	49.81	16.52	7.27	0.21	0.16	8.53	6.75	9.42	2.71	11.46	112.84	0.00	112.84
50	53.67	18.72	7.92	0.21	0.17	8.53	6.75	9.90	2.85	12.05	120.77	0.00	120.77

Table VOC MCV 38 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	34.02	8.27	1.72	0.22	0.04	9.83	7.78	6.62	1.91	8.06	78.45	0.00	78.45
5	35.04	8.79	2.36	0.22	0.05	9.83	7.78	6.86	1.97	8.34	81.24	0.00	81.24
10	36.22	9.37	3.01	0.22	0.06	9.83	7.78	7.11	2.05	8.65	84.30	0.00	84.30
15	37.59	10.04	3.65	0.22	0.08	9.83	7.78	7.38	2.13	8.99	87.68	0.00	87.68
20	39.17	10.82	4.29	0.22	0.09	9.83	7.78	7.68	2.21	9.35	91.43	0.00	91.43
25	41.00	11.72	4.94	0.22	0.10	9.83	7.78	8.00	2.30	9.74	95.62	0.00	95.62
30	43.13	12.78	5.58	0.22	0.12	9.83	7.78	8.35	2.40	10.16	100.34	0.00	100.34
35	45.61	14.06	6.22	0.22	0.13	9.83	7.78	8.73	2.51	10.62	105.71	0.00	105.71
40	48.54	15.62	6.87	0.22	0.15	9.83	7.78	9.15	2.63	11.13	111.90	0.00	111.90
45	52.01	17.57	7.51	0.22	0.16	9.83	7.78	9.60	2.76	11.69	119.12	0.00	119.12
50	56.16	20.07	8.15	0.22	0.17	9.83	7.78	10.11	2.91	12.30	127.71	0.00	127.71

Table VOC MCV 39 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	35.15	8.53	1.96	0.23	0.04	11.32	8.96	6.71	1.93	8.17	82.99	0.00	82.99
5	36.23	9.08	2.60	0.23	0.05	11.32	8.96	6.96	2.00	8.46	85.89	0.00	85.89
10	37.49	9.70	3.24	0.23	0.06	11.32	8.96	7.22	2.08	8.78	89.08	0.00	89.08
15	38.93	10.42	3.89	0.23	0.08	11.32	8.96	7.50	2.16	9.13	92.61	0.00	92.61
20	40.61	11.25	4.53	0.23	0.09	11.32	8.96	7.80	2.25	9.50	96.54	0.00	96.54
25	42.55	12.23	5.17	0.23	0.10	11.32	8.96	8.14	2.34	9.90	100.94	0.00	100.94
30	44.81	13.40	5.82	0.23	0.12	11.32	8.96	8.50	2.45	10.34	105.93	0.00	105.93
35	47.46	14.81	6.46	0.23	0.13	11.32	8.96	8.89	2.56	10.82	111.63	0.00	111.63
40	50.59	16.55	7.11	0.23	0.15	11.32	8.96	9.32	2.68	11.34	118.24	0.00	118.24
45	54.31	18.76	7.75	0.23	0.16	11.32	8.96	9.80	2.82	11.92	126.02	0.00	126.02
50	58.80	21.64	8.39	0.23	0.17	11.32	8.96	10.33	2.97	12.57	135.37	0.00	135.37

Table VOC MCV 40 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	36.31	8.80	2.20	0.24	0.04	13.04	10.32	6.81	1.96	8.28	87.97	0.00	87.97
5	37.45	9.38	2.84	0.24	0.05	13.04	10.32	7.06	2.03	8.59	90.99	0.00	90.99
10	38.78	10.05	3.48	0.24	0.06	13.04	10.32	7.33	2.11	8.92	94.32	0.00	94.32
15	40.31	10.83	4.13	0.24	0.08	13.04	10.32	7.62	2.19	9.27	98.01	0.00	98.01
20	42.09	11.73	4.77	0.24	0.09	13.04	10.32	7.93	2.28	9.65	102.14	0.00	102.14
25	44.15	12.80	5.41	0.24	0.10	13.04	10.32	8.28	2.38	10.07	106.78	0.00	106.78
30	46.56	14.08	6.06	0.24	0.12	13.04	10.32	8.65	2.49	10.52	112.06	0.00	112.06
35	49.39	15.64	6.70	0.24	0.13	13.04	10.32	9.06	2.61	11.02	118.14	0.00	118.14
40	52.74	17.60	7.34	0.24	0.15	13.04	10.32	9.51	2.74	11.57	125.23	0.00	125.23
45	56.74	20.12	7.99	0.24	0.16	13.04	10.32	10.00	2.88	12.17	133.65	0.00	133.65
50	61.58	23.47	8.63	0.24	0.17	13.04	10.32	10.55	3.04	12.84	143.88	0.00	143.88

Table VOC MCV 41 Financial Cost of Operation of MCV on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	37.49	9.09	2.43	0.24	0.04	15.02	11.88	6.90	1.99	8.40	93.48	0.00	93.48
5	38.70	9.71	3.08	0.24	0.05	15.02	11.88	7.16	2.06	8.72	96.62	0.00	96.62
10	40.11	10.43	3.72	0.24	0.06	15.02	11.88	7.44	2.14	9.05	100.10	0.00	100.10
15	41.73	11.27	4.36	0.24	0.08	15.02	11.88	7.74	2.23	9.42	103.97	0.00	103.97
20	43.61	12.25	5.01	0.24	0.09	15.02	11.88	8.07	2.32	9.82	108.31	0.00	108.31
25	45.81	13.42	5.65	0.24	0.10	15.02	11.88	8.42	2.42	10.25	113.21	0.00	113.21
30	48.37	14.83	6.29	0.24	0.12	15.02	11.88	8.81	2.54	10.72	118.82	0.00	118.82
35	51.40	16.58	6.94	0.24	0.13	15.02	11.88	9.23	2.66	11.23	125.31	0.00	125.31
40	54.99	18.79	7.58	0.24	0.15	15.02	11.88	9.70	2.79	11.80	132.94	0.00	132.94
45	59.30	21.69	8.22	0.24	0.16	15.02	11.88	10.22	2.94	12.43	142.10	0.00	142.10
50	64.54	25.64	8.87	0.24	0.17	15.02	11.88	10.79	3.11	13.13	153.40	0.00	153.40

Table VOC MCV 42 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	28.77	6.37	0.86	0.19	0.04	4.78	3.78	5.93	1.71	7.21	59.63	0.00	59.63
5	29.48	6.67	1.50	0.19	0.05	4.78	3.78	6.14	1.77	7.47	61.82	0.00	61.82
10	30.31	7.00	2.14	0.19	0.06	4.78	3.78	6.36	1.83	7.74	64.21	0.00	64.21
15	31.29	7.37	2.79	0.19	0.08	4.78	3.78	6.60	1.90	8.03	66.81	0.00	66.81
20	32.43	7.78	3.43	0.19	0.09	4.78	3.78	6.86	1.97	8.35	69.67	0.00	69.67
25	33.77	8.23	4.07	0.19	0.11	4.78	3.78	7.14	2.06	8.69	72.82	0.00	72.82
30	35.33	8.74	4.72	0.19	0.12	4.78	3.78	7.45	2.14	9.06	76.31	0.00	76.31
35	37.15	9.32	5.36	0.19	0.13	4.78	3.78	7.78	2.24	9.46	80.21	0.00	80.21
40	39.30	9.99	6.00	0.19	0.15	4.78	3.78	8.14	2.34	9.91	84.58	0.00	84.58
45	41.84	10.75	6.65	0.19	0.16	4.78	3.78	8.54	2.46	10.39	89.54	0.00	89.54
50	44.85	11.64	7.29	0.19	0.17	4.78	3.78	8.98	2.58	10.93	95.20	0.00	95.20

Table VOC MCV 43
Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	29.78	6.52	1.02	0.20	0.04	5.51	4.36	6.01	1.73	7.31	62.46	0.00	62.46
5	30.53	6.84	1.66	0.20	0.05	5.51	4.36	6.22	1.79	7.57	64.73	0.00	64.73
10	31.42	7.19	2.30	0.20	0.06	5.51	4.36	6.45	1.86	7.85	67.20	0.00	67.20
15	32.46	7.57	2.95	0.20	0.08	5.51	4.36	6.70	1.93	8.15	69.90	0.00	69.90
20	33.68	8.00	3.59	0.20	0.09	5.51	4.36	6.97	2.01	8.48	72.88	0.00	72.88
25	35.09	8.49	4.23	0.20	0.11	5.51	4.36	7.26	2.09	8.83	76.16	0.00	76.16
30	36.75	9.03	4.88	0.20	0.12	5.51	4.36	7.57	2.18	9.21	79.81	0.00	79.81
35	38.70	9.65	5.52	0.20	0.13	5.51	4.36	7.92	2.28	9.63	83.90	0.00	83.90
40	40.99	10.36	6.17	0.20	0.15	5.51	4.36	8.29	2.39	10.09	88.50	0.00	88.50
45	43.70	11.18	6.81	0.20	0.16	5.51	4.36	8.71	2.51	10.60	93.73	0.00	93.73
50	46.94	12.15	7.45	0.20	0.17	5.51	4.36	9.17	2.64	11.15	99.74	0.00	99.74

Table VOC MCV 44 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	30.80	6.68	1.18	0.21	0.04	6.34	5.02	6.09	1.75	7.41	65.52	0.00	65.52
5	31.61	7.01	1.82	0.21	0.05	6.34	5.02	6.31	1.82	7.68	67.87	0.00	67.87
10	32.55	7.38	2.47	0.21	0.06	6.34	5.02	6.55	1.88	7.97	70.43	0.00	70.43
15	33.66	7.78	3.11	0.21	0.08	6.34	5.02	6.80	1.96	8.28	73.24	0.00	73.24
20	34.95	8.24	3.75	0.21	0.09	6.34	5.02	7.08	2.04	8.61	76.34	0.00	76.34
25	36.46	8.75	4.40	0.21	0.11	6.34	5.02	7.38	2.12	8.98	79.77	0.00	79.77
30	38.22	9.33	5.04	0.21	0.12	6.34	5.02	7.70	2.22	9.38	83.59	0.00	83.59
35	40.30	10.00	5.68	0.21	0.13	6.34	5.02	8.06	2.32	9.81	87.87	0.00	87.87
40	42.75	10.76	6.33	0.21	0.15	6.34	5.02	8.45	2.43	10.28	92.72	0.00	92.72
45	45.65	11.65	6.97	0.21	0.16	6.34	5.02	8.88	2.56	10.81	98.26	0.00	98.26
50	49.13	12.70	7.61	0.21	0.17	6.34	5.02	9.36	2.69	11.39	104.64	0.00	104.64

Table VOC MCV 45 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	31.84	6.84	1.34	0.22	0.04	7.31	5.78	6.18	1.78	7.51	68.84	0.00	68.84
5	32.70	7.19	1.99	0.22	0.05	7.31	5.78	6.40	1.84	7.79	71.27	0.00	71.27
10	33.71	7.58	2.63	0.22	0.06	7.31	5.78	6.65	1.91	8.09	73.93	0.00	73.93
15	34.88	8.01	3.27	0.22	0.08	7.31	5.78	6.91	1.99	8.41	76.85	0.00	76.85
20	36.26	8.49	3.92	0.22	0.09	7.31	5.78	7.19	2.07	8.75	80.08	0.00	80.08
25	37.86	9.04	4.56	0.22	0.11	7.31	5.78	7.50	2.16	9.13	83.67	0.00	83.67
30	39.74	9.66	5.20	0.22	0.12	7.31	5.78	7.84	2.26	9.54	87.67	0.00	87.67
35	41.96	10.37	5.85	0.22	0.13	7.31	5.78	8.21	2.36	9.99	92.18	0.00	92.18
40	44.57	11.20	6.49	0.22	0.15	7.31	5.78	8.62	2.48	10.48	97.29	0.00	97.29
45	47.69	12.16	7.13	0.22	0.16	7.31	5.78	9.06	2.61	11.03	103.16	0.00	103.16
50	51.44	13.31	7.78	0.22	0.17	7.31	5.78	9.56	2.75	11.63	109.96	0.00	109.96

Table VOC MCV 46 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	32.91	7.01	1.50	0.23	0.04	8.42	6.66	6.26	1.80	7.62	72.45	0.00	72.45
5	33.82	7.38	2.15	0.23	0.05	8.42	6.66	6.50	1.87	7.90	74.97	0.00	74.97
10	34.89	7.79	2.79	0.23	0.06	8.42	6.66	6.75	1.94	8.21	77.74	0.00	77.74
15	36.14	8.25	3.43	0.23	0.08	8.42	6.66	7.02	2.02	8.54	80.78	0.00	80.78
20	37.60	8.76	4.08	0.23	0.09	8.42	6.66	7.31	2.11	8.90	84.15	0.00	84.15
25	39.31	9.34	4.72	0.23	0.11	8.42	6.66	7.63	2.20	9.29	87.90	0.00	87.90
30	41.31	10.01	5.36	0.23	0.12	8.42	6.66	7.98	2.30	9.71	92.10	0.00	92.10
35	43.67	10.77	6.01	0.23	0.13	8.42	6.66	8.37	2.41	10.18	96.85	0.00	96.85
40	46.48	11.67	6.65	0.23	0.15	8.42	6.66	8.79	2.53	10.69	102.25	0.00	102.25
45	49.82	12.72	7.30	0.23	0.16	8.42	6.66	9.25	2.66	11.26	108.48	0.00	108.48
50	53.87	13.99	7.94	0.23	0.17	8.42	6.66	9.77	2.81	11.89	115.75	0.00	115.75

Table VOC MCV 47 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	33.99	7.20	1.67	0.24	0.04	9.69	7.67	6.35	1.83	7.73	76.40	0.00	76.40
5	34.96	7.58	2.31	0.24	0.05	9.69	7.67	6.59	1.90	8.02	79.02	0.00	79.02
10	36.10	8.02	2.95	0.24	0.06	9.69	7.67	6.85	1.97	8.34	81.90	0.00	81.90
15	37.43	8.50	3.60	0.24	0.08	9.69	7.67	7.13	2.05	8.68	85.07	0.00	85.07
20	38.98	9.05	4.24	0.24	0.09	9.69	7.67	7.44	2.14	9.05	88.59	0.00	88.59
25	40.80	9.67	4.88	0.24	0.11	9.69	7.67	7.77	2.24	9.45	92.51	0.00	92.51
30	42.94	10.38	5.53	0.24	0.12	9.69	7.67	8.13	2.34	9.89	96.93	0.00	96.93
35	45.46	11.21	6.17	0.24	0.13	9.69	7.67	8.53	2.45	10.38	101.93	0.00	101.93
40	48.46	12.18	6.81	0.24	0.15	9.69	7.67	8.97	2.58	10.91	107.66	0.00	107.66
45	52.07	13.33	7.46	0.24	0.16	9.69	7.67	9.45	2.72	11.50	114.29	0.00	114.29
50	56.44	14.73	8.10	0.24	0.17	9.69	7.67	9.99	2.88	12.16	122.07	0.00	122.07

Table VOC MCV 48 Financial Cost of Operation of MCV on Intermediate Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	35.10	7.39	1.83	0.24	0.04	11.17	8.83	6.45	1.86	7.84	80.74	0.00	80.74
5	36.13	7.80	2.47	0.24	0.05	11.17	8.83	6.69	1.93	8.14	83.46	0.00	83.46
10	37.34	8.25	3.11	0.24	0.06	11.17	8.83	6.96	2.00	8.47	86.45	0.00	86.45
15	38.76	8.77	3.76	0.24	0.08	11.17	8.83	7.25	2.09	8.82	89.76	0.00	89.76
20	40.41	9.35	4.40	0.24	0.09	11.17	8.83	7.56	2.18	9.20	93.44	0.00	93.44
25	42.34	10.02	5.05	0.24	0.11	11.17	8.83	7.91	2.28	9.62	97.56	0.00	97.56
30	44.62	10.79	5.69	0.24	0.12	11.17	8.83	8.28	2.38	10.08	102.20	0.00	102.20
35	47.32	11.68	6.33	0.24	0.13	11.17	8.83	8.70	2.50	10.58	107.49	0.00	107.49
40	50.55	12.74	6.98	0.24	0.15	11.17	8.83	9.15	2.63	11.14	113.57	0.00	113.57
45	54.43	14.01	7.62	0.24	0.16	11.17	8.83	9.66	2.78	11.75	120.65	0.00	120.65
50	59.17	15.56	8.26	0.24	0.17	11.17	8.83	10.22	2.94	12.44	129.01	0.00	129.01

Table VOC MCV 49 Financial Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	27.60	5.60	0.79	0.19	0.04	4.17	3.30	5.64	1.62	6.87	55.81	1.56	57.38
5	28.20	5.83	1.43	0.19	0.05	4.17	3.30	5.84	1.68	7.11	57.81	1.62	59.42
10	28.92	6.08	2.07	0.19	0.06	4.17	3.30	6.06	1.74	7.37	59.98	1.68	61.66
15	29.77	6.36	2.72	0.19	0.08	4.17	3.30	6.29	1.81	7.66	62.35	1.74	64.09
20	30.79	6.66	3.36	0.19	0.09	4.17	3.30	6.54	1.88	7.96	64.95	1.81	66.76
25	31.98	6.99	4.00	0.19	0.11	4.17	3.30	6.82	1.96	8.29	67.82	1.89	69.70
30	33.39	7.35	4.65	0.19	0.12	4.17	3.30	7.11	2.05	8.65	70.99	1.97	72.95
35	35.04	7.76	5.29	0.19	0.13	4.17	3.30	7.44	2.14	9.05	74.51	2.06	76.57
40	37.00	8.21	5.93	0.19	0.15	4.17	3.30	7.79	2.24	9.48	78.47	2.15	80.62
45	39.33	8.72	6.58	0.19	0.16	4.17	3.30	8.18	2.35	9.95	82.93	2.26	85.19
50	42.10	9.29	7.22	0.19	0.17	4.17	3.30	8.61	2.48	10.47	88.01	2.38	90.39

Table VOC MCV 50 Financial Cost of Operation of MCV on Two Lane Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	28.56	5.71	0.91	0.20	0.04	4.81	3.80	5.72	1.65	6.96	58.36	1.58	59.94
5	29.21	5.95	1.56	0.20	0.05	4.81	3.80	5.93	1.71	7.21	60.42	1.64	62.06
10	29.98	6.22	2.20	0.20	0.06	4.81	3.80	6.15	1.77	7.48	62.67	1.70	64.38
15	30.89	6.50	2.84	0.20	0.08	4.81	3.80	6.39	1.84	7.78	65.14	1.77	66.90
20	31.98	6.82	3.49	0.20	0.09	4.81	3.80	6.65	1.91	8.09	67.84	1.84	69.68
25	33.25	7.17	4.13	0.20	0.11	4.81	3.80	6.93	2.00	8.43	70.82	1.92	72.74
30	34.75	7.55	4.77	0.20	0.12	4.81	3.80	7.24	2.08	8.81	74.13	2.00	76.13
35	36.52	7.98	5.42	0.20	0.13	4.81	3.80	7.57	2.18	9.21	77.83	2.09	79.92
40	38.62	8.46	6.06	0.20	0.15	4.81	3.80	7.94	2.29	9.66	81.98	2.20	84.17
45	41.11	9.00	6.70	0.20	0.16	4.81	3.80	8.34	2.40	10.15	86.68	2.31	88.98
50	44.09	9.62	7.35	0.20	0.17	4.81	3.80	8.79	2.53	10.70	92.05	2.43	94.48

Table VOC MCV 51 Financial Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	29.54	5.83	1.04	0.21	0.04	5.54	4.38	5.80	1.67	7.06	61.11	1.60	62.71
5	30.24	6.08	1.68	0.21	0.05	5.54	4.38	6.01	1.73	7.32	63.24	1.66	64.91
10	31.06	6.36	2.33	0.21	0.06	5.54	4.38	6.24	1.80	7.60	65.58	1.73	67.30
15	32.04	6.66	2.97	0.21	0.08	5.54	4.38	6.49	1.87	7.90	68.13	1.80	69.93
20	33.20	6.99	3.61	0.21	0.09	5.54	4.38	6.76	1.95	8.22	70.95	1.87	72.82
25	34.56	7.36	4.26	0.21	0.11	5.54	4.38	7.05	2.03	8.58	74.06	1.95	76.01
30	36.16	7.76	4.90	0.21	0.12	5.54	4.38	7.37	2.12	8.96	77.52	2.04	79.55
35	38.05	8.22	5.55	0.21	0.13	5.54	4.38	7.71	2.22	9.38	81.39	2.13	83.52
40	40.29	8.73	6.19	0.21	0.15	5.54	4.38	8.09	2.33	9.85	85.75	2.24	87.99
45	42.96	9.30	6.83	0.21	0.16	5.54	4.38	8.51	2.45	10.36	90.71	2.36	93.06
50	46.17	9.96	7.48	0.21	0.17	5.54	4.38	8.98	2.59	10.93	96.40	2.48	98.88

Table VOC MCV 52 Financial Cost of Operation of MCV on Two Lane Roads (Rs/km)

RF	Fuel Cost		Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	30.54	5.96	1.17	0.22	0.04	6.38	5.05	5.88	1.69	7.16	64.08	1.63	65.71
5	31.29	6.22	1.81	0.22	0.05	6.38	5.05	6.10	1.76	7.43	66.30	1.69	67.98
10	32.17	6.51	2.46	0.22	0.06	6.38	5.05	6.34	1.82	7.71	68.72	1.75	70.47
15	33.22	6.82	3.10	0.22	0.08	6.38	5.05	6.59	1.90	8.02	71.37	1.82	73.20
20	34.45	7.17	3.74	0.22	0.09	6.38	5.05	6.87	1.98	8.36	74.30	1.90	76.20
25	35.90	7.56	4.39	0.22	0.11	6.38	5.05	7.17	2.06	8.72	77.55	1.98	79.53
30	37.61	7.99	5.03	0.22	0.12	6.38	5.05	7.50	2.16	9.12	81.17	2.07	83.24
35	39.63	8.47	5.67	0.22	0.13	6.38	5.05	7.86	2.26	9.56	85.23	2.17	87.40
40	42.03	9.01	6.32	0.22	0.15	6.38	5.05	8.25	2.38	10.04	89.82	2.28	92.10
45	44.90	9.63	6.96	0.22	0.16	6.38	5.05	8.69	2.50	10.58	95.06	2.40	97.46
50	48.36	10.33	7.60	0.22	0.17	6.38	5.05	9.18	2.64	11.17	101.10	2.54	103.64

Table VOC MCV 53 Financial Cost of Operation of MCV on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	31.56	6.09	1.30	0.23	0.04	7.35	5.81	5.97	1.72	7.26	67.32	1.65	68.97
5	32.36	6.36	1.94	0.23	0.05	7.35	5.81	6.19	1.78	7.54	69.61	1.71	71.32
10	33.31	6.67	2.58	0.23	0.06	7.35	5.81	6.44	1.85	7.83	72.12	1.78	73.90
15	34.42	7.00	3.23	0.23	0.08	7.35	5.81	6.70	1.93	8.15	74.89	1.85	76.74
20	35.74	7.36	3.87	0.23	0.09	7.35	5.81	6.99	2.01	8.50	77.94	1.93	79.87
25	37.28	7.77	4.51	0.23	0.11	7.35	5.81	7.30	2.10	8.88	81.33	2.02	83.35
30	39.11	8.22	5.16	0.23	0.12	7.35	5.81	7.64	2.20	9.29	85.12	2.11	87.23
35	41.27	8.73	5.80	0.23	0.13	7.35	5.81	8.01	2.31	9.75	89.38	2.22	91.60
40	43.84	9.31	6.44	0.23	0.15	7.35	5.81	8.42	2.42	10.25	94.22	2.33	96.56
45	46.93	9.97	7.09	0.23	0.16	7.35	5.81	8.88	2.56	10.80	99.77	2.46	102.23
50	50.67	10.73	7.73	0.23	0.17	7.35	5.81	9.39	2.70	11.42	106.20	2.60	108.80

Table VOC MCV 54 Financial Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	23.69	5.60	0.79	0.19	0.04	4.17	3.30	3.86	1.11	4.69	47.44	4.45	51.90
5	23.46	5.83	1.43	0.19	0.05	4.17	3.30	4.01	1.15	4.88	48.48	4.63	53.10
10	23.32	6.08	2.07	0.19	0.06	4.17	3.30	4.17	1.20	5.08	49.66	4.82	54.48
15	23.29	6.36	2.72	0.19	0.08	4.17	3.30	4.35	1.25	5.29	51.01	5.02	56.03
20	23.39	6.66	3.36	0.19	0.09	4.17	3.30	4.55	1.31	5.53	52.55	5.25	57.79
25	23.62	6.99	4.00	0.19	0.11	4.17	3.30	4.76	1.37	5.79	54.30	5.49	59.79
30	24.02	7.35	4.65	0.19	0.12	4.17	3.30	4.99	1.44	6.07	56.30	5.76	62.06
35	24.59	7.76	5.29	0.19	0.13	4.17	3.30	5.25	1.51	6.38	58.58	6.05	64.63
40	25.38	8.21	5.93	0.19	0.15	4.17	3.30	5.53	1.59	6.73	61.19	6.38	67.57
45	26.43	8.72	6.58	0.19	0.16	4.17	3.30	5.85	1.68	7.11	64.19	6.75	70.94
50	27.79	9.29	7.22	0.19	0.17	4.17	3.30	6.20	1.78	7.54	67.67	7.16	74.83

Table VOC MCV 55 Financial Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.33	5.71	0.91	0.20	0.04	4.81	3.80	3.92	1.13	4.77	49.61	4.52	54.14
5	24.13	5.95	1.56	0.20	0.05	4.81	3.80	4.07	1.17	4.96	50.71	4.70	55.41
10	24.04	6.22	2.20	0.20	0.06	4.81	3.80	4.24	1.22	5.16	51.96	4.90	56.85
15	24.06	6.50	2.84	0.20	0.08	4.81	3.80	4.43	1.27	5.39	53.38	5.11	58.49
20	24.21	6.82	3.49	0.20	0.09	4.81	3.80	4.63	1.33	5.63	55.01	5.34	60.35
25	24.50	7.17	4.13	0.20	0.11	4.81	3.80	4.85	1.40	5.90	56.86	5.59	62.45
30	24.97	7.55	4.77	0.20	0.12	4.81	3.80	5.09	1.46	6.19	58.97	5.87	64.84
35	25.62	7.98	5.42	0.20	0.13	4.81	3.80	5.36	1.54	6.52	61.38	6.18	67.56
40	26.51	8.46	6.06	0.20	0.15	4.81	3.80	5.65	1.63	6.88	64.14	6.52	70.67
45	27.67	9.00	6.70	0.20	0.16	4.81	3.80	5.98	1.72	7.28	67.33	6.90	74.24
50	29.17	9.62	7.35	0.20	0.17	4.81	3.80	6.35	1.83	7.73	71.04	7.33	78.37

Table VOC MCV 56 Financial Cost of Operation of MCV on Four Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.98	5.83	1.04	0.21	0.04	5.54	4.38	3.98	1.15	4.84	51.98	4.59	56.57
5	24.82	6.08	1.68	0.21	0.05	5.54	4.38	4.14	1.19	5.04	53.14	4.78	57.92
10	24.77	6.36	2.33	0.21	0.06	5.54	4.38	4.31	1.24	5.25	54.46	4.98	59.44
15	24.84	6.66	2.97	0.21	0.08	5.54	4.38	4.50	1.30	5.48	55.96	5.20	61.16
20	25.05	6.99	3.61	0.21	0.09	5.54	4.38	4.71	1.36	5.73	57.68	5.44	63.12
25	25.41	7.36	4.26	0.21	0.11	5.54	4.38	4.94	1.42	6.01	59.63	5.70	65.33
30	25.95	7.76	4.90	0.21	0.12	5.54	4.38	5.19	1.49	6.32	61.86	5.99	67.85
35	26.69	8.22	5.55	0.21	0.13	5.54	4.38	5.47	1.57	6.66	64.41	6.31	70.72
40	27.68	8.73	6.19	0.21	0.15	5.54	4.38	5.78	1.66	7.03	67.34	6.67	74.01
45	28.97	9.30	6.83	0.21	0.16	5.54	4.38	6.13	1.76	7.45	70.73	7.07	77.80
50	30.62	9.96	7.48	0.21	0.17	5.54	4.38	6.52	1.88	7.93	74.68	7.52	82.20

Table VOC MCV 57 Financial Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	23.77	4.36	0.70	0.19	0.04	3.53	2.80	3.75	1.08	4.56	44.78	4.33	49.11
5	23.46	4.50	1.34	0.19	0.05	3.53	2.80	3.89	1.12	4.74	45.63	4.49	50.12
10	23.25	4.65	1.99	0.19	0.06	3.53	2.80	4.05	1.17	4.93	46.61	4.67	51.28
15	23.13	4.81	2.63	0.19	0.08	3.53	2.80	4.21	1.21	5.13	47.73	4.86	52.60
20	23.14	4.98	3.28	0.19	0.09	3.53	2.80	4.40	1.27	5.35	49.01	5.07	54.09
25	23.26	5.16	3.92	0.19	0.11	3.53	2.80	4.59	1.32	5.59	50.48	5.30	55.78
30	23.53	5.36	4.56	0.19	0.12	3.53	2.80	4.81	1.38	5.85	52.14	5.55	57.70
35	23.97	5.57	5.21	0.19	0.13	3.53	2.80	5.05	1.45	6.14	54.04	5.83	59.87
40	24.59	5.80	5.85	0.19	0.15	3.53	2.80	5.31	1.53	6.46	56.21	6.13	62.34
45	25.44	6.05	6.49	0.19	0.16	3.53	2.80	5.60	1.61	6.82	58.69	6.46	65.16
50	26.55	6.32	7.14	0.19	0.17	3.53	2.80	5.93	1.71	7.21	61.55	6.84	68.39

Table VOC MCV 58 Financial Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.38	4.43	0.79	0.20	0.04	4.07	3.22	3.81	1.10	4.63	46.65	4.39	51.05
5	24.10	4.58	1.43	0.20	0.05	4.07	3.22	3.95	1.14	4.81	47.55	4.56	52.12
10	23.93	4.73	2.07	0.20	0.06	4.07	3.22	4.11	1.18	5.00	48.59	4.75	53.34
15	23.86	4.89	2.72	0.20	0.08	4.07	3.22	4.29	1.23	5.21	49.78	4.95	54.72
20	23.91	5.07	3.36	0.20	0.09	4.07	3.22	4.47	1.29	5.44	51.13	5.16	56.29
25	24.10	5.26	4.00	0.20	0.11	4.07	3.22	4.68	1.35	5.69	52.67	5.40	58.07
30	24.43	5.46	4.65	0.20	0.12	4.07	3.22	4.90	1.41	5.97	54.43	5.66	60.09
35	24.94	5.69	5.29	0.20	0.13	4.07	3.22	5.15	1.48	6.27	56.43	5.94	62.38
40	25.64	5.92	5.93	0.20	0.15	4.07	3.22	5.42	1.56	6.60	58.72	6.26	64.98
45	26.59	6.19	6.58	0.20	0.16	4.07	3.22	5.73	1.65	6.97	61.35	6.61	67.96
50	27.83	6.47	7.22	0.20	0.17	4.07	3.22	6.07	1.75	7.38	64.38	7.00	71.38

Table VOC MCV 59 Financial Cost of Operation of MCV on Six Lane Divided Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	25.00	4.50	0.87	0.21	0.04	4.69	3.71	3.86	1.11	4.70	48.69	4.46	53.15
5	24.77	4.65	1.51	0.21	0.05	4.69	3.71	4.02	1.16	4.89	49.65	4.63	54.28
10	24.63	4.81	2.16	0.21	0.06	4.69	3.71	4.18	1.20	5.09	50.74	4.82	55.57
15	24.61	4.98	2.80	0.21	0.08	4.69	3.71	4.36	1.25	5.30	51.99	5.03	57.03
20	24.71	5.17	3.44	0.21	0.09	4.69	3.71	4.55	1.31	5.54	53.42	5.25	58.68
25	24.95	5.36	4.09	0.21	0.11	4.69	3.71	4.77	1.37	5.80	55.05	5.50	60.55
30	25.35	5.57	4.73	0.21	0.12	4.69	3.71	5.00	1.44	6.08	56.90	5.77	62.67
35	25.93	5.80	5.38	0.21	0.13	4.69	3.71	5.26	1.51	6.39	59.02	6.07	65.08
40	26.73	6.05	6.02	0.21	0.15	4.69	3.71	5.54	1.59	6.74	61.44	6.39	67.83
45	27.79	6.33	6.66	0.21	0.16	4.69	3.71	5.86	1.69	7.13	64.22	6.76	70.98
50	29.16	6.62	7.31	0.21	0.17	4.69	3.71	6.21	1.79	7.56	67.43	7.17	74.61

Table VOC MCV 60 Financial Cost of Operation of MCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	-	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	23.69	5.60	0.79	0.19	0.04	4.17	3.30	3.86	1.11	4.70	47.45	4.46	51.91
5	23.46	5.83	1.43	0.19	0.05	4.17	3.30	4.01	1.16	4.88	48.48	4.63	53.12
10	23.32	6.08	2.07	0.19	0.06	4.17	3.30	4.18	1.20	5.08	49.67	4.82	54.49
15	23.30	6.36	2.72	0.19	0.08	4.17	3.30	4.35	1.25	5.30	51.02	5.03	56.05
20	23.40	6.66	3.36	0.19	0.09	4.17	3.30	4.55	1.31	5.54	52.56	5.25	57.81
25	23.63	6.99	4.00	0.19	0.11	4.17	3.30	4.76	1.37	5.79	54.32	5.49	59.82
30	24.03	7.35	4.65	0.19	0.12	4.17	3.30	4.99	1.44	6.08	56.32	5.76	62.09
35	24.61	7.76	5.29	0.19	0.13	4.17	3.30	5.25	1.51	6.39	58.61	6.06	64.67
40	25.41	8.21	5.93	0.19	0.15	4.17	3.30	5.53	1.59	6.73	61.22	6.39	67.61
45	26.46	8.72	6.58	0.19	0.16	4.17	3.30	5.85	1.68	7.12	64.24	6.75	70.99
50	27.82	9.29	7.22	0.19	0.17	4.17	3.30	6.21	1.79	7.55	67.72	7.16	74.88

Table VOC MCV 61
Financial Cost of Operation of MCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.33	5.71	0.91	0.20	0.04	4.81	3.80	3.92	1.13	4.77	49.62	4.52	54.15
5	24.13	5.95	1.56	0.20	0.05	4.81	3.80	4.08	1.17	4.96	50.72	4.71	55.42
10	24.04	6.22	2.20	0.20	0.06	4.81	3.80	4.25	1.22	5.17	51.97	4.90	56.87
15	24.06	6.50	2.84	0.20	0.08	4.81	3.80	4.43	1.28	5.39	53.40	5.11	58.51
20	24.22	6.82	3.49	0.20	0.09	4.81	3.80	4.63	1.33	5.64	55.03	5.35	60.37
25	24.51	7.17	4.13	0.20	0.11	4.81	3.80	4.85	1.40	5.90	56.88	5.60	62.48
30	24.98	7.55	4.77	0.20	0.12	4.81	3.80	5.09	1.47	6.20	58.99	5.88	64.87
35	25.64	7.98	5.42	0.20	0.13	4.81	3.80	5.36	1.54	6.52	61.41	6.19	67.60
40	26.53	8.46	6.06	0.20	0.15	4.81	3.80	5.66	1.63	6.88	64.18	6.53	70.71
45	27.70	9.00	6.70	0.20	0.16	4.81	3.80	5.99	1.72	7.29	67.38	6.91	74.29
50	29.21	9.62	7.35	0.20	0.17	4.81	3.80	6.36	1.83	7.74	71.09	7.34	78.43

Table VOC MCV 62 Financial Cost of Operation of MCV on Four Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.98	5.83	1.04	0.21	0.04	5.54	4.38	3.98	1.15	4.84	51.99	4.60	56.58
5	24.83	6.08	1.68	0.21	0.05	5.54	4.38	4.14	1.19	5.04	53.15	4.78	57.93
10	24.78	6.36	2.33	0.21	0.06	5.54	4.38	4.32	1.24	5.25	54.47	4.98	59.45
15	24.85	6.66	2.97	0.21	0.08	5.54	4.38	4.51	1.30	5.49	55.98	5.20	61.18
20	25.06	6.99	3.61	0.21	0.09	5.54	4.38	4.72	1.36	5.74	57.70	5.44	63.14
25	25.42	7.36	4.26	0.21	0.11	5.54	4.38	4.95	1.42	6.02	59.65	5.71	65.36
30	25.96	7.76	4.90	0.21	0.12	5.54	4.38	5.20	1.50	6.32	61.89	6.00	67.89
35	26.71	8.22	5.55	0.21	0.13	5.54	4.38	5.48	1.58	6.66	64.45	6.32	70.76
40	27.71	8.73	6.19	0.21	0.15	5.54	4.38	5.79	1.67	7.04	67.38	6.68	74.06
45	29.00	9.30	6.83	0.21	0.16	5.54	4.38	6.13	1.77	7.46	70.78	7.08	77.86
50	30.66	9.96	7.48	0.21	0.17	5.54	4.38	6.52	1.88	7.94	74.74	7.53	82.27

Table VOC MCV 63
Financial Cost of Operation of MCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	23.76	4.36	0.70	0.19	0.04	3.53	2.80	3.75	1.08	4.57	44.79	4.33	49.12
5	23.46	4.50	1.34	0.19	0.05	3.53	2.80	3.90	1.12	4.74	45.64	4.50	50.13
10	23.25	4.65	1.99	0.19	0.06	3.53	2.80	4.05	1.17	4.93	46.62	4.68	51.29
15	23.14	4.81	2.63	0.19	0.08	3.53	2.80	4.22	1.21	5.13	47.74	4.87	52.61
20	23.14	4.98	3.28	0.19	0.09	3.53	2.80	4.40	1.27	5.35	49.03	5.08	54.11
25	23.27	5.16	3.92	0.19	0.11	3.53	2.80	4.60	1.32	5.59	50.50	5.31	55.80
30	23.55	5.36	4.56	0.19	0.12	3.53	2.80	4.81	1.39	5.86	52.17	5.56	57.72
35	23.98	5.57	5.21	0.19	0.13	3.53	2.80	5.05	1.45	6.15	54.07	5.83	59.90
40	24.61	5.80	5.85	0.19	0.15	3.53	2.80	5.32	1.53	6.47	56.24	6.14	62.38
45	25.46	6.05	6.49	0.19	0.16	3.53	2.80	5.61	1.61	6.82	58.73	6.47	65.20
50	26.58	6.32	7.14	0.19	0.17	3.53	2.80	5.93	1.71	7.22	61.60	6.85	68.44

Table VOC MCV 64 Financial Cost of Operation of MCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.37	4.43	0.79	0.20	0.04	4.07	3.22	3.81	1.10	4.64	46.66	4.40	51.06
5	24.10	4.58	1.43	0.20	0.05	4.07	3.22	3.96	1.14	4.81	47.56	4.57	52.13
10	23.93	4.73	2.07	0.20	0.06	4.07	3.22	4.12	1.18	5.01	48.60	4.75	53.35
15	23.87	4.89	2.72	0.20	0.08	4.07	3.22	4.29	1.23	5.22	49.79	4.95	54.74
20	23.92	5.07	3.36	0.20	0.09	4.07	3.22	4.48	1.29	5.45	51.15	5.17	56.31
25	24.11	5.26	4.00	0.20	0.11	4.07	3.22	4.68	1.35	5.70	52.69	5.40	58.10
30	24.44	5.46	4.65	0.20	0.12	4.07	3.22	4.91	1.41	5.97	54.45	5.66	60.12
35	24.95	5.69	5.29	0.20	0.13	4.07	3.22	5.15	1.48	6.27	56.46	5.95	62.41
40	25.66	5.92	5.93	0.20	0.15	4.07	3.22	5.43	1.56	6.61	58.76	6.27	65.02
45	26.62	6.19	6.58	0.20	0.16	4.07	3.22	5.73	1.65	6.98	61.39	6.62	68.01
50	27.86	6.47	7.22	0.20	0.17	4.07	3.22	6.07	1.75	7.39	64.43	7.01	71.44

Table VOC MCV 65
Financial Cost of Operation of MCV on Six Lane Divided Expressways Roads (Rs/km)

RF	Fuel Cost	,	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	25.00	4.50	0.87	0.21	0.04	4.69	3.71	3.87	1.11	4.71	48.70	4.46	53.16
5	24.77	4.65	1.51	0.21	0.05	4.69	3.71	4.02	1.16	4.89	49.66	4.64	54.30
10	24.64	4.81	2.16	0.21	0.06	4.69	3.71	4.18	1.20	5.09	50.75	4.83	55.58
15	24.62	4.98	2.80	0.21	0.08	4.69	3.71	4.36	1.26	5.31	52.01	5.03	57.04
20	24.72	5.17	3.44	0.21	0.09	4.69	3.71	4.56	1.31	5.54	53.44	5.26	58.70
25	24.96	5.36	4.09	0.21	0.11	4.69	3.71	4.77	1.37	5.80	55.07	5.50	60.58
30	25.37	5.57	4.73	0.21	0.12	4.69	3.71	5.00	1.44	6.09	56.93	5.77	62.70
35	25.95	5.80	5.38	0.21	0.13	4.69	3.71	5.26	1.51	6.40	59.05	6.07	65.12
40	26.76	6.05	6.02	0.21	0.15	4.69	3.71	5.55	1.60	6.75	61.47	6.40	67.88
45	27.82	6.33	6.66	0.21	0.16	4.69	3.71	5.86	1.69	7.14	64.26	6.77	71.03
50	29.19	6.62	7.31	0.21	0.17	4.69	3.71	6.22	1.79	7.57	67.49	7.18	74.67

Table VOC MCV 66
Financial Cost of Operation of MCV on Eight Lane Divided Urban Expressways Roads (Rs/km)

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	23.89	3.57	0.66	0.19	0.04	3.25	2.57	3.65	1.05	4.44	43.32	4.21	47.53
5	23.51	3.67	1.30	0.19	0.05	3.25	2.57	3.79	1.09	4.61	44.03	4.37	48.40
10	23.23	3.76	1.95	0.19	0.06	3.25	2.57	3.93	1.13	4.78	44.87	4.54	49.41
15	23.04	3.87	2.59	0.19	0.08	3.25	2.57	4.09	1.18	4.98	45.84	4.72	50.56
20	22.96	3.98	3.23	0.19	0.09	3.25	2.57	4.26	1.23	5.18	46.95	4.92	51.87
25	22.99	4.09	3.88	0.19	0.11	3.25	2.57	4.45	1.28	5.41	48.22	5.13	53.35
30	23.16	4.22	4.52	0.19	0.12	3.25	2.57	4.65	1.34	5.66	49.67	5.36	55.03
35	23.47	4.35	5.16	0.19	0.13	3.25	2.57	4.87	1.40	5.93	51.32	5.62	56.94
40	23.95	4.49	5.81	0.19	0.15	3.25	2.57	5.11	1.47	6.22	53.21	5.90	59.11
45	24.62	4.63	6.45	0.19	0.16	3.25	2.57	5.38	1.55	6.55	55.37	6.21	61.58
50	25.54	4.79	7.09	0.19	0.17	3.25	2.57	5.68	1.64	6.91	57.84	6.56	64.40

Table VOC MCV 67
Financial Cost of Operation of MCV on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	24.47	3.62	0.72	0.20	0.04	3.75	2.96	3.70	1.07	4.51	45.04	4.28	49.31
5	24.13	3.72	1.37	0.20	0.05	3.75	2.96	3.84	1.11	4.68	45.80	4.44	50.24
10	23.89	3.82	2.01	0.20	0.06	3.75	2.96	3.99	1.15	4.86	46.69	4.61	51.30
15	23.74	3.92	2.65	0.20	0.08	3.75	2.96	4.16	1.20	5.06	47.71	4.80	52.51
20	23.70	4.04	3.30	0.20	0.09	3.75	2.96	4.33	1.25	5.27	48.88	5.00	53.88
25	23.78	4.15	3.94	0.20	0.11	3.75	2.96	4.52	1.30	5.51	50.22	5.22	55.45
30	24.00	4.28	4.58	0.20	0.12	3.75	2.96	4.73	1.36	5.76	51.75	5.46	57.22
35	24.38	4.42	5.23	0.20	0.13	3.75	2.96	4.96	1.43	6.04	53.50	5.73	59.23
40	24.93	4.56	5.87	0.20	0.15	3.75	2.96	5.22	1.50	6.35	55.49	6.02	61.51
45	25.70	4.71	6.51	0.20	0.16	3.75	2.96	5.50	1.58	6.69	57.77	6.35	64.11
50	26.72	4.87	7.16	0.20	0.17	3.75	2.96	5.81	1.67	7.07	60.39	6.71	67.10

Table VOC MCV 68
Financial Cost of Operation of MCV on Eight Lane Divided Urban Expressways Roads (Rs/km)
Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Mainte- nance Cost	Fixed Cost	Depre- ciation Cost	Crew Cost	Total Cost	Commodity Holding Cost	Grand Cost
0	25.07	3.67	0.79	0.21	0.04	4.31	3.41	3.76	1.08	4.57	46.91	4.34	51.25
5	24.76	3.77	1.43	0.21	0.05	4.31	3.41	3.90	1.12	4.75	47.72	4.50	52.23
10	24.56	3.87	2.07	0.21	0.06	4.31	3.41	4.06	1.17	4.94	48.66	4.68	53.34
15	24.45	3.98	2.72	0.21	0.08	4.31	3.41	4.22	1.22	5.14	49.74	4.88	54.62
20	24.46	4.10	3.36	0.21	0.09	4.31	3.41	4.41	1.27	5.36	50.98	5.09	56.07
25	24.60	4.22	4.00	0.21	0.11	4.31	3.41	4.61	1.33	5.60	52.40	5.32	57.71
30	24.87	4.35	4.65	0.21	0.12	4.31	3.41	4.82	1.39	5.87	54.01	5.57	59.57
35	25.32	4.49	5.29	0.21	0.13	4.31	3.41	5.06	1.46	6.16	55.85	5.84	61.69
40	25.96	4.63	5.93	0.21	0.15	4.31	3.41	5.33	1.53	6.48	57.95	6.15	64.10
45	26.82	4.79	6.58	0.21	0.16	4.31	3.41	5.62	1.62	6.84	60.36	6.49	66.84
50	27.95	4.96	7.22	0.21	0.17	4.31	3.41	5.95	1.71	7.24	63.14	6.86	70.00

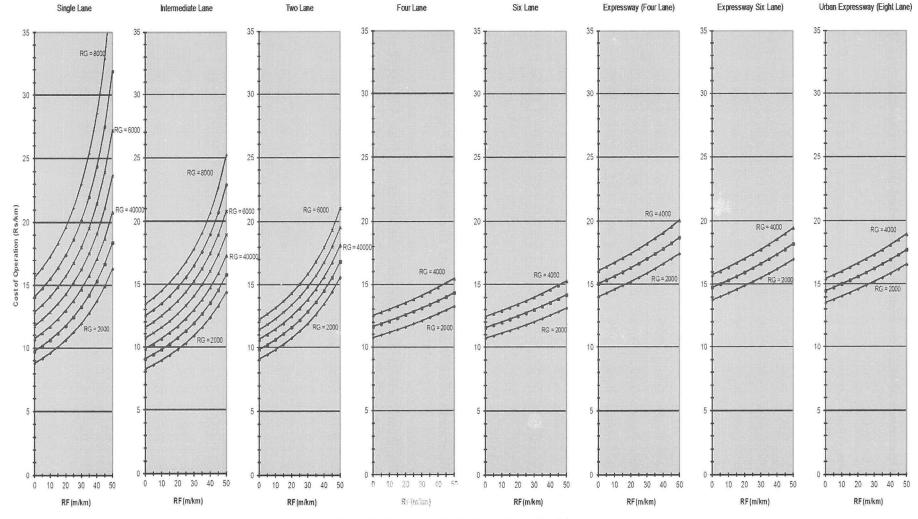


Figure D.1 Economic Cost of Operation of Small Cars



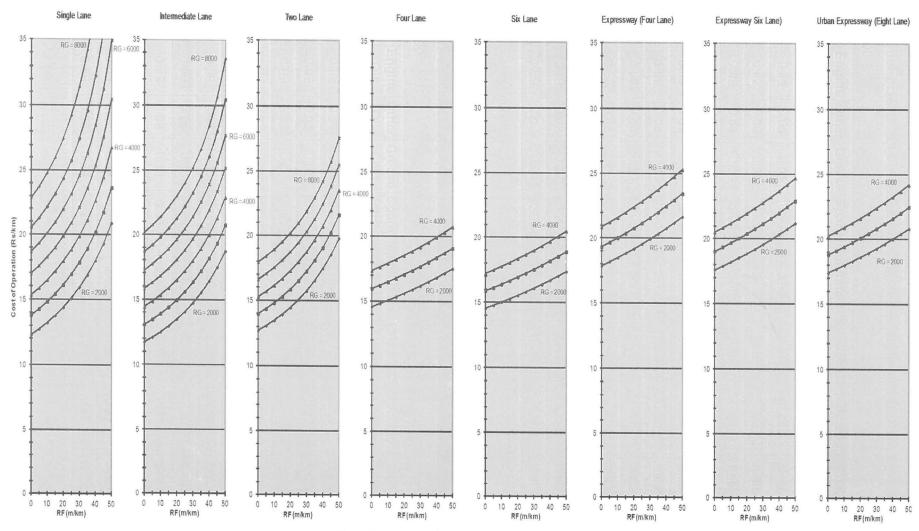


Figure D.2 Financial Cost of Operation of Small Cars

Urban Expressway (Eight Lane)

Four Lane

Six Lane

Expressway (Four Lane)

Expressway Six Lane)

Figure D.3 Economic Cost of Operation of Big Cars

Single Lane

Intermediate Lane

Two Lane

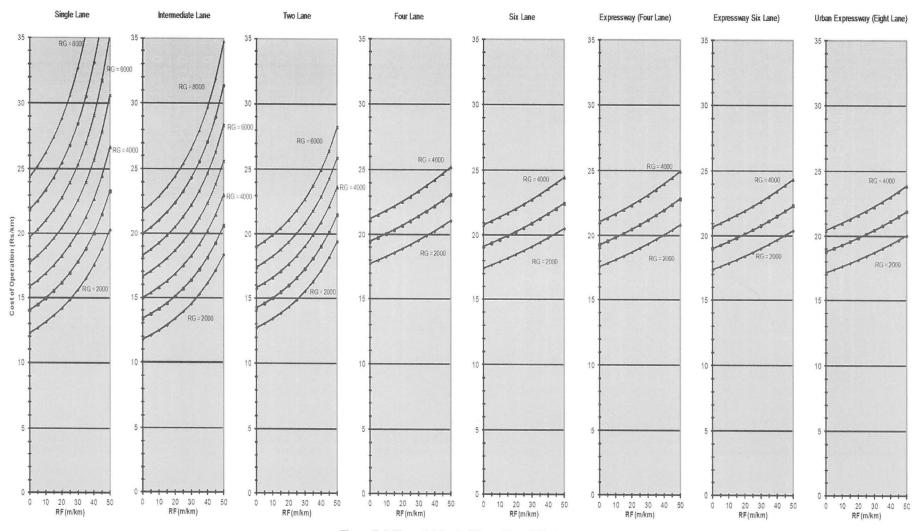


Figure D.4 Financial Cost of Operation of Big Cars

Figure D.5 Economic Cost of Operation of Two Wheeler

Single Lane

0 10 20 30 40 50 RF(m/km)

30

25

ration (Rs/km)

RG = 8000

25

20 RG = 6000 Intermediate Lane

RG=8000

0 10 20 30 40 50

RF (m/km)

Two Lane

RG = 6000

0 10 20 30 40 50

RF (m/km)

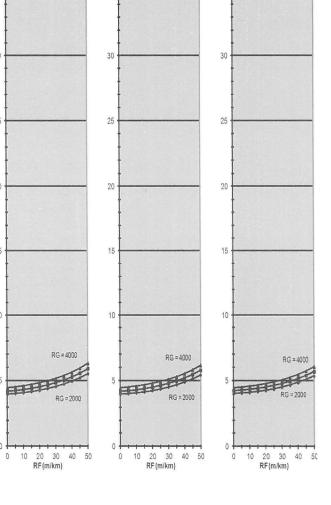
RG = 4000

Four Lane

Six Lane

RG = 4000

0 10 20 30 40 50 RF(m/km) Expressway (Four Lane)



Expressway Six Lane)

Urban Expressway (Eight Lane)

Figure D.6 Financial Cost of Operation of Two Wheeler

RG = 4000

0 10 20 30 40 50

RF(m/km)

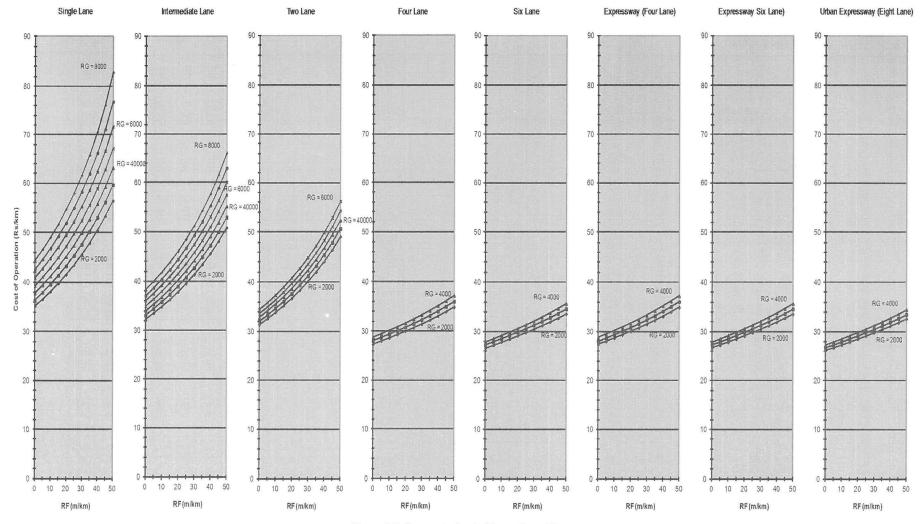


Figure D.7 Economic Cost of Operation of Bus



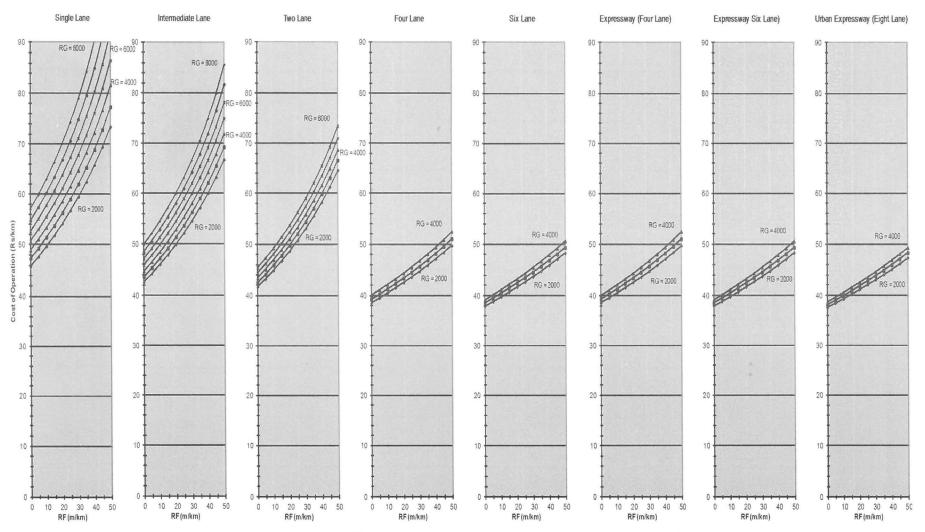


Figure D.8 Financial Cost of Operation of Bus

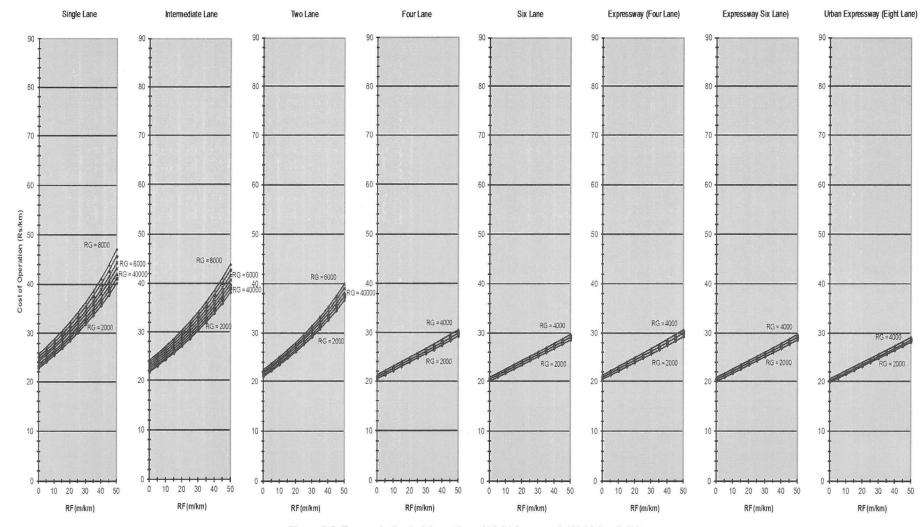


Figure D.9 Economic Cost of Operation of Light Commercial Vehicles (LCV)

0 10 20 30 40 50 RF (m/km)

Single Lane

RG = 8000

Intermediate Lane

RG = 8000

0 10 20 30 40 50

RF(m/km)

Two Lane

RG = 6000

0 10 20 30 40 50 RF(m/km)

RG = 4000

Four Lane

RG = 4000

Six Lane

RG=4000

0 10 20 30 40 50 RF(m/km)

Expressway (Four Lane)

RG = 4000

RF(m/km)

Expressway Six Lane)

Urban Expressway (Eight Lane)

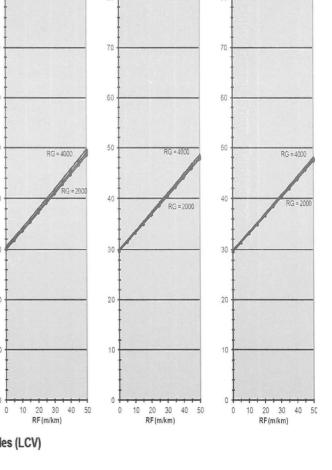


Figure D.10 Financial Cost of Operation of Light Commercial Vehicles (LCV)

0 10 20 30 40 50 RF(m/km)

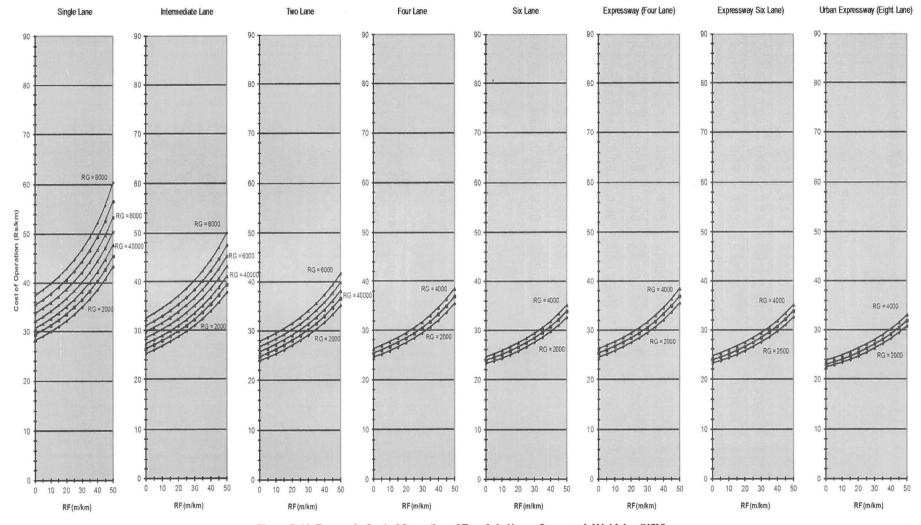


Figure D.11 Economic Cost of Operation of Two Axle Heavy Commercial Vehicles (HCV)



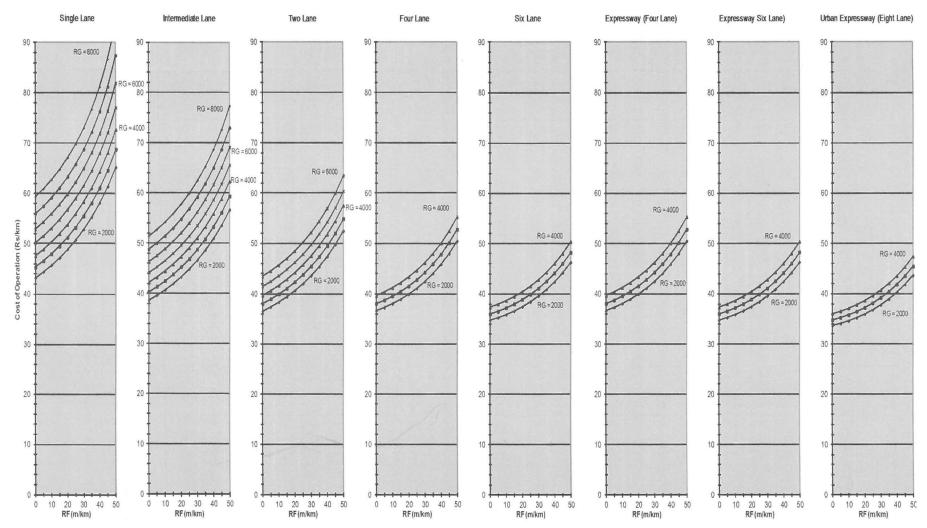


Figure D.12 Financial Cost of Operation of Heavy Commercial Vehicles (HCV)

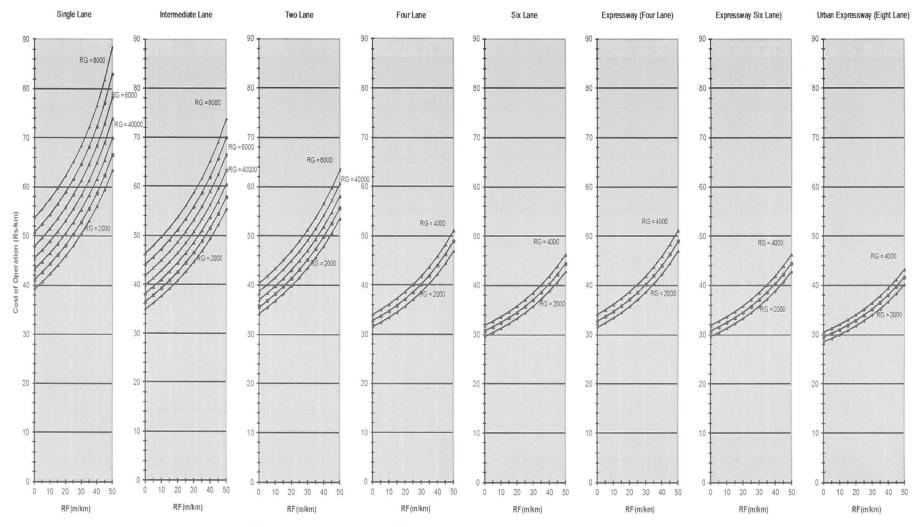


Figure D.13 Economic Cost of Operation of Multi Axle Heavy Commercial Vehicles (MCV)



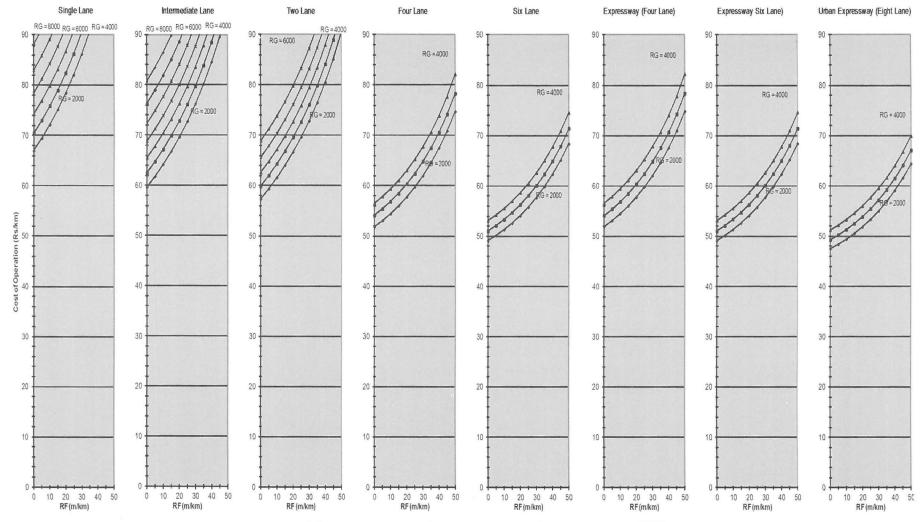


Figure D.14 Financial Cost of Operation of Multi Axle Heavy Commercial Vehicles (MCV)

(The Official amendments to this document would be published by the IRC in its periodical, 'Indian Highways' which shall be considered as effective and as part of the Code/Guidelines/Manual, etc. from the date specified therein)

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